

LEADERSHIP, CRISIS AND POLITICAL CHANGE:
THE END OF THE FORMATIVE PERIOD IN THE NEPEÑA VALLEY, PERÚ

by

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This research focuses on the transformation of political leadership in the North Coast of Peru. Specifically, it explores how crises create contexts in which existing leadership structures weaken, giving scope to the development of alternative, even competing, modes of authority and power.

This dissertation presents a multi-scalar analytical approach, at levels ranging from the community to the regional, of demographic, political, and socioeconomic changes following the disintegration of the Cupisnique-Chavín Religious Complex (750-500 B.C.) in the Nepeña Middle Valley. This loss of an overarching ideology and social order can be construed as a cultural crisis. The fieldwork on which this study is based consisted of a full coverage pedestrian regional survey of 87.8 km² of territory, and was followed by a GIS (Geographic Information System)-based reconstruction and analysis of demography, economic organization, resources, ceremonial architecture and warfare.

After 500 B.C., the survey area saw explosive population growth, multiple supra-local communities were formed, and leadership was constituted in a varied of ways. Several new power and authority bases, such as control of access to ritual spaces, dominance of certain craft production, population nucleation, and war leadership made their appearance during the Final Formative Period. During the following period, as part of a second crisis in the form of a dramatic demographic collapse, some leading households consolidated power bases, including dominance of irrigation systems and long-distance exchange networks in exotics, allowed their districts to exercise hegemony in the survey zone. These findings make it possible to explore the causes and importance of the multiple factors shaping societal outcomes in dealing with each crisis, from both agency and evolutionary perspectives.

TABLE OF CONTENTS

PREFACE	XXII
1.0 INTRODUCTION: LEADERSHIP, CRISIS, AND POLITICAL CHANGE	1
1.1 LEADERSHIP AND POWER	2
1.1.1 Leadership, Communities, and Power Resources	3
1.1.2 Self-aggrandizers, Cooperation, Competition and Resistance.....	5
1.2 CRISIS AND COLLAPSE	7
1.2.1 Political Crisis, Risk, and Change.....	9
1.3 CRISIS AND SOCIAL CHANGE IN THE NORTH COAST: THE NEPEÑA VALLEY CASE-STUDY	12
1.3.1 The Late Formative in the Lower Nepeña Valley	13
1.3.2 The Final Formative in the Lower Nepeña Valley.....	14
1.3.3 The Middle Valley Research Zone: A Different Trajectory.....	15
1.4 RESEARCH QUESTIONS	16
1.4.1 Research Question 1	17
1.4.2 Research Question 2	18
1.4.3 Research Question 3	19
1.4.4 Research Question 4	19
1.4.5 Research Question 5	20
1.4.6 Research Question 6	21
2.0 ENVIRONMENTAL SETTING AND HISTORICAL CONTEXT	22
2.1 ENVIRONMENTAL SETTING.....	22
2.1.1 Physical and Modern Human Geography	22
2.1.2 Precipitation and Hydrology.....	24
2.1.3 Ecological Variation.....	26
2.2 SOCIOPOLITICAL TRAJECTORIES OF THE NEPEÑA VALLEY IN ITS REGIONAL CONTEXT BETWEEN 1200 B.C. AND 500 A.D.	27

2.2.1	The Middle Formative Period: 1200-800 B.C.....	27
2.2.2	The Late Formative Period: 800-500 B.C.	30
2.2.3	The Final Formative Period: 500-200 B.C.....	32
2.2.4	The Epi-Formative and the Early Intermediate Period: 200 B.C.-500 A.D.....	35
2.3	SUMMARY	38
3.0	METHODOLOGY	40
3.1	REGIONAL SURVEY IN THE MIDDLE NEPEÑA VALLEY.....	41
3.1.1	Survey Area, Limits and Scale	41
3.1.2	Regional Survey in the Middle Nepeña Valley	43
3.1.3	Survey Techniques and Methods of Surface Collection	47
3.1.4	Architectural Remains and Other Landscape Features	51
3.1.5	Summary and Survey Results	53
3.2	CERAMIC CLASSIFICATION AND CHRONOLOGY.....	56
3.2.1	Ceramic Classification	57
3.2.2	Summary and Results.....	58
3.3	PROXIES FOR THE RECONSTRUCTION OF SOCIO-ECONOMIC PATTERNS.....	61
3.3.1	High Ranking Households.....	61
3.3.2	Patterns of Productive Differentiation.....	61
3.3.3	Long Distance Exchange of Prestige Goods	62
4.0	IDENTIFYING LEADERS.....	65
4.1	THE ARCHAEOLOGICAL IDENTIFICATION OF LEADERS.....	65
4.2	METHODOLOGY AND RESULTS	66
4.3	AN INITIAL EXPLORATION OF PATTERNS OF LEADERSHIP.....	73
4.3.1	Leadership and the Control over Craft Production	73
4.3.2	Leadership and Long-Distance Exchange.....	75
4.3.3	Leadership and Ritual Practices.....	76
4.4	SUMMARY	76
5.0	DEMOGRAPHY AND COMMUNITIES	79
5.1	METHODS OF REGIONAL DEMOGRAPHIC ANALYSIS.....	79
5.1.1	Relative Demographic Reconstruction	81
5.1.2	Absolute Demographic Estimates.....	84
5.2	LOCAL AND SUPRALOCAL COMMUNITIES.....	87

5.3	SPATIAL DEMOGRAPHIC PATTERNS	96
5.3.1	Regional Population Distribution.....	97
5.3.2	Demographic Centralization.....	100
5.4	LEADERS AND DEMOGRAPHIC PATTERNS.....	105
5.4.1	Leaders' Households Distribution.....	105
5.4.2	Leaders' Households Centralization	108
5.5	SUMMARY AND INTERPRETATIONS	112
6.0	PATTERNS OF COMMUNITY ECONOMIC ORGANIZATION	116
6.1	CRAFT PRODUCTION DIFFERENTIATION.....	116
6.1.1	Ceramic Production Distribution	117
6.1.2	Ceramic Production Concentration	121
6.1.3	Ceramic Production Intensity	124
6.1.4	Leaders and Ceramic Production Locations.....	127
6.2	LONG-DISTANCE EXCHANGE COMMUNITY PATTERNS.....	129
6.2.1	Exotics Distribution	130
6.2.2	Exotics Concentration	132
6.2.3	Leaders and Exotics.....	134
6.3	SUMMARY AND INTERPRETATIONS	136
7.0	AGRICULTURAL POTENTIAL AND SOCIOECONOMIC PATTERNS	140
7.1	SOILS AND AGRICULTURAL POTENTIAL.....	140
7.2	AGRICULTURAL POTENTIAL AND DEMOGRAPHIC PATTERNS	145
7.3	AGRICULTURAL POTENTIAL AND LEADERSHIP	147
7.3.1	Leaders and Prime Soils	149
7.3.2	Leaders and Relative Agricultural Potential	153
7.3.3	Irrigation Systems, Districts and Leaders.....	157
7.4	SUMMARY AND INTERPRETATIONS	161
8.0	CEREMONIAL ARCHITECTURE, RITUAL PRACTICES AND POWER.....	163
8.1	LOCATION OF THE CEREMONIAL CENTERS	166
8.2	FUNCTIONAL CHARACTERISTICS OF PUBLIC SPACES	170
8.2.1	Relative Accessibility to Plazas	170
8.2.2	Horizontal versus Vertical Emphasis of Ritual Construction.....	172
8.3	LABOR POOL AND THE CONSTRUCTION OF THE PUBLIC CENTERS	174

8.4	USERS AND AUDIENCES OF THE CEREMONIAL CENTERS.....	178
8.4.1	Plaza Audience: Where did the public come from?	179
8.4.2	Leaders and Ceremonial Centers.....	184
8.5	OTHER ACTIVITIES: LARGE SCALE STORAGE	188
8.6	THE SETTLEMENT CONTEXT AND STYLISTIC VARIABILITY OF CEREMONIAL CENTERS.....	190
8.6.1	Settlement Context of Ritual Spaces	190
8.6.2	The Tradition of Megalithic Architecture.....	194
8.7	SUMMARY AND DISCUSSION	197
9.0	CONFLICT AND WARFARE.....	205
9.1	CURRENT MODELS OF THE NATURE OF EARLY CONFLICT IN THE PERUVIAN NORTH COAST....	206
9.2	ANALYZING THE CHARACTERISTICS OF THE WARFARE.....	207
9.3	CONFLICT AND VIOLENCE IN THE SURVEY ZONE.....	209
9.3.1	Period I.....	209
9.3.2	Period II.....	210
9.3.3	Period III.....	217
9.4	LEADERS AND WARFARE.....	219
9.5	SUMMARY AND INTERPRETATIONS	221
10.0	DISCUSSION: TRAJECTORIES OF SOCIAL CHANGE IN THE MIDDLE NEPEÑA VALLEY	225
10.1	PERIOD I: THE CUPISNIQUE-CHAVÍN RELIGIOUS COMPLEX.....	225
10.2	PERIOD II: POLITICAL CRISIS AND SOCIAL FLUX: THE EMERGENCE OF NEW LEADERSHIP	229
10.3	PERIOD III: POLITICAL CONSOLIDATION AND THE RISE OF REGIONAL POLITIES.....	236
11.0	CONCLUSIONS.....	240
11.1	THE END OF THE FORMATIVE IN THE PERUVIAN NORTH COAST.....	240
11.1.1	Demographic Transitions	241
11.1.2	Abandonment and Replacement of Ceremonial Centers	241
11.1.3	Conflict	242
11.1.4	Development of Economic Dominance	243
11.1.5	Political Variability, Experimentation and Transformation of Leadership	244
11.1.6	Household Bottom-up Economic Initiatives	245
11.2	CRISIS, LEADERSHIP AND SOCIAL CHANGE.....	246
11.3	DIRECTIONS OF FUTURE RESEARCH.....	247
	APPENDIX A	248

APPENDIX B.....	255
APPENDIX C.....	289
APPENDIX D	297
BIBLIOGRAPHY	309

LIST OF TABLES

Table 3-1 Frequency of systematic and general collections according the surface visibility.....	55
Table 3-2 Summary of collections from survey units.	55
Table 3-3 Frequency of systematic and general collections according to the presence of architectural remains.....	56
Table 3-4 References for cross-dating archaeological assemblages from the Middle Nepeña Valley.....	58
Table 3-5 Wares classified as exotics compared with other sites.....	63
Table 4-1 Number of survey units and proportion of fineware in each collection.	67
Table 4-2 Number of survey units and proportion of fineware in each collection (sherds $n \geq 5$ and fineware proportion < 0.9).	68
Table 4-3 Reduction of the number of collections for analysis after data cleaning.	71
Table 4-4 Reduction of sample size after data cleaning according to the population estimates.	71
Table 4-5 Comparison by rank of collections with evidence of ceramic production for Period I.	74
Table 4-6 Comparison by rank of collections with evidence of ceramic production for Period II.	74
Table 4-7 Comparison by rank of collections with evidence of ceramic production for Period III.	74
Table 4-8 Comparison by rank of collections with exotics for Period I.....	75
Table 4-9 Comparison by rank of collections with exotics for Period III.....	75
Table 4-10 Comparison by rank of collections with panpipes for Period II.	76
Table 5-1 Population estimates for the surveyed area by period using relationships A and B.....	86
Table 6-1 Relative Intensity of Ceramic Production as Ratios of Sherd Scrapers and Total Sherds by Period by District.	126
Table 7-1 Soil Types in the survey zone.....	141
Table 7-2 Characteristics of the soils types in the survey zone.	142
Table 7-3 Distribution of households according to irrigation potential.....	146
Table 7-4 Sample sizes of rank classes per period.....	147

Table 7-5 Table of assigned values for each limiting factor of soil productivity.	154
Table 7-6 Relative soil productivity based in their cumulative limitations	154
Table 8-1 Major Ceremonial Centers Analyzed in this Chapter	164
Table 8-2 Result of the analysis of spatial correlation between the ceremonial centers and the demographic centers.....	168
Table 8-3 Classification of Relative Accessibility of Innermost Plaza.....	170
Table 8-4 Results of the analysis of relative accessibility of public spaces in the major ceremonial centers.	171
Table 8-5 Degree of Horizontality/Verticality of Ceremonial Centers.	174
Table 8-6 Estimated amount of raw material used in the construction of the major ceremonial centers.	175
Table 8-7 Estimated amount of labor investment in each ceremonial center.	176
Table 8-8 Estimated days of labor per year required for each ceremonial center.	177
Table 8-9 Estimated days of labor per period.	178
Table 8-10 Comparative chart for estimated audience of largest plaza in each district by period.	181
Table 8-11 Difference in average distance between higher and lower ranked households by district during Period I.	185
Table 8-12 Difference in average distance between higher and lower ranked households by district during Period II.	186
Table 8-13 Difference in average distance between higher and lower ranked households by district during Period III.	188
Table 8-14 Classes of settlement context for ceremonial spaces.....	191
Table 8-15 Classification of ceremonial centers according to their settlement context.	192
Table 8-16 Presence of megalithic architecture in the ceremonial centers in the survey zone.	196
Table 9-1 Summary of archaeological proxies for the analysis of the characteristics of warfare.....	208
Table 9-2 Weaponry evidence by household rank.	220
Table 10-1 Population estimates for four contiguous valleys.....	230
Table A- 1 Basic information on studied households.	251
Table A- 2 Average distances for each type of garbage from the houses	251
Table A- 3 Result of the analysis of distance of dispersion of the garbage.....	252
Table A- 4 Maximum Limit of Garbage Dispersion From the Dwellings.	252
Table A- 5 Consolidated data by house.	253

Table C- 1 Summary of Cases Used in the Analysis.....	290
Table C- 2 Estimates of Roofed Area of Dwellings in Each Case	290
Table C- 3 Occupants Estimates for Each Case.....	291

LIST OF FIGURES

Figure 1-1 Potential scenarios assessed in this research.....	17
Figure 2-1 Map showing the location of the regional surveys, major archaeological sites cited, and the area of the present investigation (in pink).	23
Figure 2-2 Comparative sequences for the Ancash Formative Period.....	28
Figure 3-1 Map of the Nepeña Valley comparing the survey area of this investigation with the approximate location of the Proulx (1985) and Daggett (1984) surveys.....	41
Figure 3-2 Map of the Moro Pocket and the limits of the survey in relation to modern features.	43
Figure 3-3 Survey boundaries overlaid over an orthorectified panchromatic Geoeye image layer.	48
Figure 3-4 Location of the survey units recorded in the fieldwork.....	54
Figure 3-5 Histograms of the area of the survey units.	55
Figure 3-6 Correspondence between defined wares and cultural periods of the North Coast.....	59
Figure 3-7 Maps showing the distribution of survey lots by period. The intensity of red color indicates the density of sherd in each respective period. The green area indicates the modern cultivable zone, while the blue polylines indicate the Nepeña river system.....	60
Figure 3-8 Scrapers made from reused sherds, and a modern plastic tool of similar function (left). Labels indicate the survey unit followed by specimen number.	62
Figure 3-9 Examples of imported pottery or exotics: a) Ware I- B; b) Ware I-F; c) Ware I-G; d) Ware III-B; e) Ware III-C; f) Ware III-D.	64
Figure 4-1 Histograms of fineware proportion in each collection by period (sherds $n \geq 5$ and fine. prop. < 0.9).	68
Figure 4-2 Map with the collections for Period I (sherd $n \geq 5$ and fine. prop. < 0.9) according to their rank class.....	69
Figure 4-3 Map with the collections for Period II (sherd $n \geq 5$ and fine. prop. < 0.9) according to their rank class.....	69

Figure 4-4 Map with the collections for Period III (sherd $n \geq 5$ and fine. prop. < 0.9) according to their rank class.....	70
Figure 4-5 Map with the location of leading groups for Period I.....	72
Figure 4-6 Map with the location of leading groups for Period II.....	72
Figure 4-7 Map with the location of leading groups for Period III.....	73
Figure 5-1 Frequency distribution of sherd densities in systematic collections.	81
Figure 5-2 Relative demographic estimates for the surveyed area according: a) number of collections, b) total area of collections, c) total number of sherds, and d) density-area index by century.	83
Figure 5-3 View of a dwelling from survey unit 1773.	84
Figure 5-4 Maximum, average and minimum absolute demographic figures by period for the surveyed area using relationships A and B.....	86
Figure 5-5 Surfaces representing Period I community interaction. Smoothing increases from top to bottom, with inverse distance powers of 4, 2, 1, 0.5, 0.25, and 0.001 respectively.	89
Figure 5-6 Surfaces representing Period II community interaction. Smoothing increases from top to bottom, with inverse distance powers of 4, 2, 1, 0.5, 0.25, and 0.001 respectively.	90
Figure 5-7 Surfaces representing Period III community interaction. Smoothing increases from top to bottom, with inverse distance powers of 4, 2, 1, 0.5, 0.25, and 0.001 respectively.	91
Figure 5-8 Very low cut-off contour lines from power 4 surfaces used to delimit clusters of households or local communities, for the Period I, II, and III, respectively. The red shade in the right indicates the survey units with occupation for each period.....	92
Figure 5-9 Very low cut-off contour lines used to delimit supra-local communities or districts for each period. Cut-off contour lines from power 1 surfaces were selected at right, and displayed at left with surfaces smoothed with power 0.001, power 0.25, and power 0.25 for Period I, II and III, respectively. ..	94
Figure 5-10 Bullet graphs of the density of surface artifacts by topography.....	95
Figure 5-11 Absolute average population estimates by districts by period.....	98
Figure 5-12 Regional demographic distribution as a share of the total survey area population. Numbers between parentheses represent the share if only the population organized in supra-local communities or districts are considered.	99
Figure 5-13 Districts with the twelve concentric rings with similar area used for the centralization analyses. The demographic center is indicated with a red dot.	102

Figure 5-14 B-values and centralization graphs (dark line) with 90% of confidence zone (shaded area) for each supra-local community (SLC) or district by Period. The three graphs of the right show the same estimates for the whole survey zone by period.	103
Figure 5-15 Demographic centralization expressed in B-values for each supra-local community or district by period. The intensity of red in the background indicates the relative density of occupation (10 m resolution).....	104
Figure 5-16 Distribution of higher ranked households between districts as a share of the total regional estimate. Intensity of red reflects the share.	106
Figure 5-17 Comparison with bullet graphs between the districts' proportions of the total population and total number of higher ranked households (Rank 1-3) in the survey zone during Period I, II and III.....	107
Figure 5-18 Location of short-term (blue dots) and long-term (red dots) higher ranked households in the survey zone by period. Contours show population density and red polygons represents population clusters.	109
Figure 5-19 B-values and centralization graphs for the distribution of higher ranked households contrasted with the 90% confidence zone of population proportions (shaded area) for each supra-local community SLC) or district by Period. The three graphs of the right show the same estimates for the whole survey zone by period.....	110
Figure 5-20 Map showing the location (red dots) and degrees of concentration around the districts' demographic centers (B-values) of higher ranked households (red dots).....	111
Figure 5-21 Summary graph of demographic tendencies by period: A) Absolute regional population size, B) B-value for the whole survey zone, C) average B-value of the districts per period, and D) standard deviation (δ) of B-values of the districts per period. E) summary B-value of higher ranked households for the whole survey zone.	114
Figure 6-1 Regional distribution of ceramic production based on their share from the total amount of sherd scrapers, used as proxy, estimated in the survey area.	118
Figure 6-2 Comparison with bullet graphs of the demographic and ceramic production proportions for each supra-local community during Period I, II and III. Population sample is the number of households in the survey zone, while the ceramic production proxy sample size was calculated as the estimated total number of sherds of scrapers divided by 3.	119
Figure 6-3 Differences as percentages between estimated total reused sherd scrapers by district and the expectation based in their population. Numbers between parentheses indicate the difference as the estimated absolute number of reused sherd scrapers in excess or missing by district.....	120

Figure 6-4 B-values and centralization graphs for ceramic production, based in sherds scraper distribution, contrasted with the 90% confidence zone of population proportions (shaded area) for each supra-local community (SLC) or district by Period. The three graphs of the right show the same estimates for the whole survey zone by period.....	122
Figure 6-5 Map showing the degrees of concentration (B-values) of pottery production around the demographic centers in each district. Density of scrapers from a 10 m resolution raster (red) and population density (contour lines) are displayed for comparison.	123
Figure 6-6 Graphs of the media of ceramic production intensity ratios per ring per district described as the number of standard deviations from the media of the district.	125
Figure 6-7 Correlation (as percentage of overlapping) between buffer areas of units with evidence of higher ranked households and evidence of ceramic production.	128
Figure 6-8 Regional distribution of exotics based in the share from the total amount estimated in the survey area.	130
Figure 6-9 Comparison with bullet graphs of the demographic and exotics proportions for each supra-local community during Period I, II and III. Population sample size is the number of households in the survey zone, while the exotics sample size is the estimated number of imported sherds.	131
Figure 6-10 B-values and centralization graphs for exotics distribution, contrasted with the 90% confidence zone of population proportions (shaded area) for each supra-local community (SLC) or district by Period. The two graphs of the right show the same estimates for the whole survey zone by period..	132
Figure 6-11 Map showing the degrees of concentration (B-values) of exotics around the demographic centers in each district. Density of exotics from a 10 m resolution raster (red) and population density (contour lines) are displayed for comparison.	133
Figure 6-12 Correlation (as percentage of overlapping) between buffer areas of higher ranked households and evidence of exotics by period.	135
Figure 6-13 Summary graph of ceramic production tendencies by period: A) Absolute regional population size, B) B-value for the whole survey zone, C) average B-value of the districts per period, and D) standard deviation (δ) of B-values of the districts per period.	139
Figure 7-1 Map with the soil types in the survey zone.	141
Figure 7-2 Map with the soil ranks (ONERN 1972) in the survey zone.	143
Figure 7-3 Map with the water availability (green) in the survey zone. Canals and reservoirs are interpreted as: possible Formative Period (F?), Middle Horizon Period (MH), Late Intermediate Period (LIP), and modern (M). Springs recorded during the fieldwork are indicated as (s).	144

Figure 7-4 Comparison with bullet graphs of the natural occurrence of soil types with the proportion of households in each soil type by period.	146
Figure 7-5 Maps with 500 meters buffers around a selected sample of households by period.....	148
Figure 7-6 Comparison with bullet graphs of soil classes proportions inside catchments of households by rank during Period I.	150
Figure 7-7 Comparison with bullet graphs of soil classes proportions inside catchments of households by aggregated rank during Period I.	151
Figure 7-8 Comparison with bullet graphs of soil classes proportions inside catchments of households by rank during Period II.	151
Figure 7-9 Comparison with bullet graphs of soil classes proportions inside catchments of households by aggregated rank during Period II.	152
Figure 7-10 Comparison with bullet graphs of soil classes proportions inside catchments of households by rank during Period III.	152
Figure 7-11 Comparison with bullet graphs of soil classes proportions inside catchments of households by aggregated rank during Period III.	153
Figure 7-12 Comparison with bullet graphs of the mean agricultural potential, estimated as area of equivalent prime soil (ha), of the catchment zones of households by rank and period.....	156
Figure 7-13 Bullet graphs of the mean agricultural potential, estimated as area of equivalent prime soil (ha), of the catchment zones of households by aggregated rank and period.	156
Figure 7-14 Suggested division of land according to hypothetical independent irrigation systems.....	157
Figure 7-15 Suggested path of irrigation canals (dashed blue), cultivable lands (green), population density (red) and higher ranked households (yellow dots) during Period I.	158
Figure 7-16 Suggested path of irrigation canals (dashed blue), cultivable lands (green), population density (red) and higher ranked households (yellow dots) during Period II.	159
Figure 7-17 Suggested path of irrigation canals (dashed blue), cultivable lands (green), population density (red) and higher ranked households (yellow dots) during Period III.	160
Figure 8-1 Archaeological evidence of unfinished buildings in the survey zone: San Juan (a), Anta (b), Virahuanca Bajo South (c), and Quisque (d). This last one shows the abandonment of the original megalithic architecture project and the use of expedient walls, including a tower (in the picture).	165
Figure 8-2 Correspondence between the location of ceremonial centers (red bar) and the demographic distribution in each district.....	167
Figure 8-3 Map of the major ceremonial center of Period I (Red).	168

Figure 8-4 Map of the major ceremonial center of Period I/II (Blue) and Period II (Red).....	169
Figure 8-5 Map of the major ceremonial center of Period III (Red).	169
Figure 8-6 Diagram of the vertical (a) and horizontal (b) values used to determine the vertical/horizontal emphasis in ritual architecture.....	172
Figure 8-7 Ceremonial centers ranked by the ratio of their maximum vertical difference and the length of their largest plaza.	173
Figure 8-8 Delimited area used to estimate the audience for local scale ritual space (plaza). Structures (black), survey units (red) and their label (orange) are indicated in the image.....	179
Figure 8-9 Catchment zone (yellow) for the estimated audience of the Period I U-shaped ceremonial center.	182
Figure 8-10 Catchments for minimum (dark tones) and maximum (light tones) estimated audiences of each unfinished ceremonial center of Period I/II (using population estimates for Period II).	183
Figure 8-11 Catchments of minimum (dark tones) and maximum (light tones) estimated audience for each ceremonial center of Period II.	183
Figure 8-12 Catchments of minimum (darker color) and maximum (lighter color) estimated audience for each ceremonial center of Period III.	184
Figure 8-13 Comparison with bullet graphs of the average time that takes to go to the closest ceremonial center from higher and lower ranked households during Period I.....	185
Figure 8-14 Comparison with bullet graphs of the average time that takes to go to the closest ceremonial center from higher and lower ranked households during Period II.....	186
Figure 8-15 Comparison with bullet graphs of the average time that takes to higher and lower ranked households to go to the closest ceremonial center during Period III.	187
Figure 8-16 Possible storage structures (in red) in or near the ceremonial centers.	189
Figure 8-17 Oversized vessels from Kushipampa	190
Figure 8-18 Graphical representation of settlement context of plazas: U-temple (1), enclosure (2), mound-enclosure complex (3), enclosed mound complex (4), fortress (5), hilltop complex (6), elite compound or palace (7), and fortified village (8). Plazas are indicated as gray shaded areas. These models do not represent real settlements.	191
Figure 8-19 Distribution of types of settlement contexts of ceremonial spaces for Period I/II and Period II.	193
Figure 8-20 Megalithic style in El Molino-Motocachi (a), Paredones (b), Vinchamarca (c), and Quisque (d).	195

Figure 9-1 Macces assigned by R. Larco as Cupisnique (Middle-Late Formative) (Larco Museum in Lima: (a) ML 300064, b) ML 301322)	210
Figure 9-2 Period II districts, fortresses (red), ceremonial centers (yellow) and possible communication routes (arrows).....	211
Figure 9-3 Detailed view of fortifications and defensive walls around SLC 203 during Period II.....	213
Figure 9-4 Example of polished slate/shale points from survey units a) 2525 and (b) 2836.	215
Figure 9-5 Map of the location of weapons in the survey zone.	216
Figure 9-6 Ceramic figurines (a) with weaponry (b: spear, c-e: macces, f: spear throwers, g: dart, h: sling, i: shield) from excavations in Chankillo, Casma Valley (Taken from Ghezzi 2006: Fig. 3.4).....	216
Figure 9-7 Period III districts, fortresses (red), ceremonial centers (yellow).....	217
Figure 9-8 Early Intermediate Period Gallinazo style (a and b) and Recuay style (c and d) ceramic vessels with warrior depictions (a) ML016294, b) ML016299, c) ML029513, and d) ML031715).....	219
Figure 9-9 Comparison with bullet graphs of the distances to the fortresses/fortified towns of households according to their relative rank and weighted by population size for Period II and III.	221
Figure 9-10 Nepeña Valley sites and proposed buffer zone (Daggett 1984, Ikehara and Chicoine 2011). Lower Valley sites are shown at actual size.....	223
Figure 10-1 Reconstruction of the construction of leaderships during the Late Formative Period (Period I).	227
Figure 10-2 Disruptions (gray) in the political system in the survey zone by the end of the Late Formative (Period I).....	228
Figure 10-3 Reconstruction of the construction of leadership during the Final Formative Period (Period II). Some relationships varied among districts (red) while others were temporary (dashed line).	235
Figure 10-4 Reconstruction of construction of leaderships during the first half of the Early Intermediate Period (Period III). Some relationships reflect dominance (dashed line).....	238
Figure A- 1 Location of the rural households of this study. Nepeña town is visible in the center of the image. Google Earth 2014.	249
Figure A- 2 Location of survey transects and the findings in each house.	250
Figure A- 3 Scatterplots of the transect comparing the maximum distance of garbage and the distance of the fence.	253
Figure A- 4 Scatterplot of houses comparing the maximum distance of garbage and the years of occupation.....	254

Figure A- 5 Scatterplot of houses comparing the maximum distance of garbage and the average household size.....	254
Figure A- 6 Cumulative frequency of heavy garbage and concentrations according to the distance to the house.....	254
Figure B- 1 Pottery and ceramic artifacts of Ware I-A and Ware I-B.	273
Figure B- 2 Pottery and ceramic artifacts of Ware I-C, Ware I-D and Ware I-E.	274
Figure B- 3 Pottery and ceramic artifacts of Ware I-F, Ware I-G and Ware II-A.	275
Figure B- 4 Pottery and ceramic artifacts of Ware II-B.	276
Figure B- 5 Pottery and ceramic artifacts of Ware II-C.	277
Figure B- 6 Pottery and ceramic artifacts of Ware II-D, Ware III-A and Ware III-B.	278
Figure B- 7 Pottery and ceramic artifacts of Ware III-C, Ware III-D and Ware III-E.....	279
Figure B- 8 Pottery and ceramic artifacts of Ware III-F.	280
Figure B- 9 Pottery and ceramic artifacts of Ware IV-A.....	281
Figure B- 10 Pottery and ceramic artifacts of Ware IV-B and Ware IV-C.	282
Figure B- 11 Pottery and ceramic artifacts of Ware IV-D.....	283
Figure B- 12 Pottery and ceramic artifacts of Ware IV-E, and Ware V-A.	284
Figure B- 13 Pottery and ceramic artifacts of Ware V-B.....	285
Figure B- 14 Pottery and ceramic artifacts of Ware V-C and Ware V-D.....	286
Figure B- 15 Pottery and ceramic artifacts of Ware V-E, and Ware V-F.	287
Figure B- 16 Pottery and ceramic artifacts of Ware V-G and Ware V-H.	288
Figure C- 1 Histograms of the value of ratios between dwelling roofed areas and population estimates	292
Figure C- 2 Map of cases A to F.	293
Figure C- 3 Map of cases G to K.....	294
Figure C- 4 Map of cases L to N.	295
Figure C- 5 Map of the cases O and P.....	296
Figure D- 1 Plans of the ceremonial centers of the Period I and Period I/II.....	298
Figure D- 2 Plans of the ceremonial centers of the Period II.	299
Figure D- 3 Plans of the ceremonial centers of the Period II (cont.).....	300
Figure D- 4 Plans of the ceremonial centers of the Period III.	301
Figure D- 5 Photographs of ceremonial centers of Nuevo Moro 4, San Juan and Paredones.	302
Figure D- 6 Photographs of ceremonial centers of Anta, Quisque Bajo and Virahuanca Bajo South.	303

Figure D- 7 Photographs of ceremonial centers of fortress in Complejo Quisque, Kushipampa and architectural details of Kushipampa.	304
Figure D- 8 Photographs of ceremonial centers of El Molino-Motocachi, Chacuas Cucho 5 and Cerro San Isidro.....	305
Figure D- 9 Photographs of ceremonial centers of Cerro Motocahi 8, Vinchamarca and Virahuanca Cerro.	306
Figure D- 10 Photographs of ceremonial centers of Virahuanca Bajo North, Complejo Quisque and Virahuanca Alto.	307
Figure D- 11 Photographs of ceremonial centers of Huancarpón, Chacuas Cucho 1 and detail of standing stone (huanca) from Chacuas Cucho 1.....	308

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1.0 INTRODUCTION: LEADERSHIP, CRISIS, AND POLITICAL CHANGE

The evolution of political complexity is a leitmotif in reconstructing the past, one that predates the emergence of archaeology as a discipline. Correspondingly, the image of “collapse,” a rapid, dysfunctional decrease in political complexity, scale, and integration, has been an equally familiar trope in thinking about, and reconstructing, the past. Archaeologists are now accustomed to deconstructing the notion of “collapse,” recognizing its ethnocentric assumptions, reductionist simplifications, and subjective aspect. To cite but one example, scholars are now much less inclined to assume collapse as a society-wide process. Instead, “collapse” may be only the dissolution, of the uppermost level of political hierarchy or political integration, leaving untouched lower level configurations, and accompanied by little or no change in the life of the bulk of the population (Marcus 1989; McAnany and Yoffee 2010b).

As an alternative, I use the term “crisis”, arguably a more neutral concept, to organize examining a context in which political innovation, breaks with tradition, contesting of authority, and alternative leadership flourished following the abrupt erosion of traditional power relations. This thesis looks at the structural conditions prevailing at the onset of a crisis and explores the emergence of novel power configurations during the crisis and its resolution.

My focus is on the construction and transformation of leadership strategies and their manifestations in the Middle Nepeña Valley between 1200 B.C. and A.D. 500. The main goals of the research included reconstructing societal change, and examining the spatial loci of political activity to identify the nature and dynamics of leadership strategies over this long time period. The fieldwork and subsequent analysis allowed me to; (i) analyze changes in community and regional level political strategies in juxtaposition with regional shifts in agriculture, exchange, demography, and conflict; and (ii) develop the prehistoric Middle Nepeña as an epistemologically useful case study for assessing conceptualizations of .collapse, crisis, and social upheaval current in Andean archaeology.

1.1 LEADERSHIP AND POWER

The nature of political leadership has always been of interest in consideration of past societies. Accordingly, the construction of power has been a perennial subject of archaeology, of necessity closely connected to any discussion of political complexity and social hierarchy (Carneiro 1970; Earle 1991, 1997; Hayden and Villeneuve 2010; Kirch 1984; Price and Feinman 1995; Vaughn, et al. 2009; Vaughn, et al. 2005). As the exercise of political leadership, power (broadly defined) has been parsed in a variety of ways: power to versus power over (Cobb 1993); corporate versus network (Blanton, et al. 1996); coercive versus voluntaristic (Carneiro 1970); hegemonic versus ideological (Janusek 2005) and so forth.

Seen very broadly (and citing only the most relevant treatments from the Andean archaeological literature), recent archaeological consideration of political leadership can be grouped into two approaches. One approach lies in distinguishing in which domains of social life (social, economic, military/coercive, or ideological) power strategies lie, examining how these strategies are materialized, and recognizing the relationships among them (Earle 1997; Mann 1986). A second approach includes perspectives that draw implicitly or explicitly from practice theory, and focuses on the situated nature of political leadership through investigation of the social field that conveys and structures power (Giddens 1986; Janusek 2005; Moore 2005; Stanish and Haley 2005). As Moore (2005) points out, the central goals of this practice approach are to uncover the differing modalities of cultural logics and social agents, to reconstruct how power relations are created and manipulated, and to examine their interplay. This approach has been particularly effective in studying the formation of authority and the materialization of political leadership ideologies (DeMarrais, et al. 1996; Moore 1996c). Synthesizing the two approaches directs attention to venues and activities through which leadership is expressed and authority developed, at different social scales and contexts, and to how material resources and technology are employed in such situations for these goals.

Following this viewpoint, in this study, power is not considered as a quality, but as a relationship in which the actions of some individuals or groups modify other's decisions. Wolf (1990) and Cobb (1993) differentiate between modes of power and how they shape the authority, stability, and the influence of leaders. One mode of power lies in relations in which one's will can be imposed over or can influence others, but only under regulated contexts or settings (Wolf's definition of power as capability, power as ability and tactical/organizational power). Political actors take advantages of the situations presented to them, but without the capability to change the conditions in which political competition occurs. Charismatic, "big-man" or achieved leadership roles are examples in which successful performances can

provide to some individuals temporary leverage and authority to influence others' decision, or gain social capital (prestige) to be used for their own benefit (Clark and Blake 1994; Sahlins 1963; Spencer 1993). Such leveraging may be very coercive, while not rooted in a formal power structure. Public contexts such as feasts provide ideal scenarios for such performance and competition (Dietler 1990; Hayden 1990). However, these modalities of power are limited, unstable, require frequent reaffirmation, and are exposed to high levels of competition and contestation (Clark and Blake 1994; Sahlins 1963; Spencer 1993). (Hayden 2001)

An alternative modality involves the control over the distribution and direction of energy flows which provides individuals and/or groups the capability to manipulate the arena of interaction (Cobb 1993's "power to", and Earle 1997's control over the political economy). This structural power can be considered a mechanism by which leaders institutionalize their position, in keeping with what Wolf (1990) refers as to "govern." The emergence of different modalities of power relations requires a shift in the way people conceptualize them -what they allow or not- and the creation of mechanisms for its implementation. Thus the conditions that permit leaders to exercise structural power and to make people accept it, will always remain a keystone topic for anthropological research (Carneiro 1998; Earle 1997; Gilman 2001; Spencer 1993; Stanish 2004).

1.1.1 Leadership, Communities, and Power Resources

Leadership is constituted at multiple social scales inside communities formed in the fabric of interactions between individuals and households (Peterson and Drennan 2005). These communities provide the resources, but also set the limits of the development, extension, and transformation of power relations that are the foundations of such leadership.

The vectors of interactions are constrained by biological, cultural and technological limitations (Hodder 1979; Johnson 1982; Kosse 2001). Interactions vary in intensity and frequency, being stronger between some individuals, households, and collectivities, while weaker or inexistent among others. These patterns, regularities and tendencies have been interpreted as the existence of social boundaries (Barth 1969). However, in contrast to former approaches (i.e. Binford 1962), these communities are not closed; their boundaries are continuously constructed and redefined through time, and in a variety of scales and social domains, while connectedness with the surrounding natural and social environment is unceasing (Eisenstadt 1988). The archaeology of communities involves the discovering of the scales at which these

structures were manifested and the meaningful units by which they can be studied (Peterson and Drennan 2005).

The structure of the community is the social matrix that provides the resources for the construction and practice of power relations; but it also provides limits for the action of political actors. For instance, population scale, its distribution, and density are important conditions shaping political action. For example, a very small population can limit faction building processes, and thus may limit the scale of the competition for power (Brumfiel 1994; Clark and Blake 1994). On the other hand, larger groups confront organizational problems that require segmentation and/or hierarchies to organize a community (Feinman 2011; Johnson 1982). Additionally, population dispersion and aggregation can shape the centrifugal or centripetal characters of political strategies, and the direction in which authority is delegated (Beck 2003). And finally, the interrelation between demographic patterns and distribution of resources can shape productive differentiation inside communities, increasing or reducing the chances for centralized control over the production and distribution of resources and goods (i.e. Feinman, et al. 1984)

The socio-economic organization and ideology of some communities permit some individuals, households or groups to control critical resources or goods, their extraction, production, or their exchange (Earle 2002; Langebaek 1991), ritual (Potter 2000; Rick 2005), land tenure (de Montmollin 1989d), coercive means (Carneiro 1998; Spencer 1994), or the combination of these. The creation of such inequalities may be an important step toward the emergence of structural power. Earle (1997) favors economic means as the most stable basis for rule, because such strategies are based on control of the political economy. From a different perspective, Spencer (1993), following Sahlins (1963), has argued in favor of the importance of the balance between internal and external dimensions of authority. The external sources, such as warfare or long distance exchange, causes leaders to be positioned not only within the set of interactions with the immediate community members –the local community-, but in a larger regional network, that allow them to operate partially outside the sanctioning norms of the local community, surpassing any local structural conditions with egalitarian tendencies.

Leadership emerges from the implicit or explicit negotiation and acceptance of these structural relationships by others. Leaders are not completely free agents. Instead their roles and actions are situated in the intersection of different vectors of social interaction, and these actions are continually checked or monitored by others (Giddens 1986; Stanish 2004). Moreover, while there is a large number of possibilities of potential behavior, these are restricted by the history and recurrence of past practices, *habitus* or tradition (Bourdieu 1977; Clark and Blake 1994; Ferguson and Whitehead 1992a:16-18;

Giddens 1986; Hastorf 2010). This situated nature always provides important boundaries of what a leader can or cannot envision and do.

The conditions in which power relations are created make some political systems relatively stable: the rules and conditions are maintained despite the rotation of political actors (Dillehay 2004; Hastorf 2010). However, rapid and drastic shifts between configurations or alternatives do exist, and they are typically described in terms of the emergence of leadership based on resources that were not available or were unimportant before, to revolutionary counter-ideologies, or things like “revitalization” movements. In some cases these changes are so disruptive that the rules or conditions in which the political game is played are changed (Rosenberg 1994)

Inside communities, disjunctive behavior, antisystem ideology, resistance, and alternative or subversive power practices are always seeds for social change (Eisenstadt 1988; Van der Leeuw 2009). However, their marginality during epochs of relatively political stability keeps them dormant. For instance, in the quest for prestige, charismatic leaders have to follow the conditions in which political competition is performed. Innovating or breaking the rules are potential threats to the prestige and authority of not only leaders, but to the integration and stability of the community as well. When social systems function relatively well and have highly predictive outcomes, aversion to risk may characterize people’s actions (Fitzhugh 2001). Accordingly, the self-aggrandizing behavior -the potential motor for social change-(Brumfiel 1994; Clark and Blake 1994; Drennan 2000; Spencer 1993), find its ways in the structure of social interaction, but also it is exposed to restrictions and limitations of its inherent transformative character (Dillehay 2004; Hastorf 2010; Rosenberg 1994).

If the structure and conformation of the community allow and delimit how power relations are constructed and routinized providing the political system with relative stability and reducing the benefits of innovation, than *what are the conditions that permit alternative, innovative or disruptive behavior to be more acceptable or beneficial?*

1.1.2 Self-aggrandizers, Cooperation, Competition and Resistance

Aspiring and current leaders find restrictions not only in the available power resources –or power sources- and tradition, but also when their actions may encounter competition and resistance. While self-aggrandizing behavior is, in a sense, what results when people compete, it can be argued that it is competition that makes changes happen (Clark and Blake 1994). Actors and households acquire resources, mobilize labor, and build factions to support their political path (Brumfiel 1994; Spencer 1993).

According to Clark and Blake (1994), this competition in the long term, creates an unexpected situation in which the cost to participate increases and social differentiation emerges. This shift restricts the access to available resources, reducing the number of potential competitors. While it is theoretically expected that many people will promote themselves, in practice only few individuals have the social and economic resources to become relevant political agents.

For some scholars, the degree of cooperation with the leaders is fundamentally the result of rational choice based on the perception of higher benefits (Stanish 2004) or least costs (Gilman 2001) of supporting such positions. Mechanisms of regulation of power, construction of trust, provisioning of meaning and legitimization of social activities develop to enhance (and rationalize) this cooperation, and to deal with the tension caused by the emergence of inequality (Eisenstadt 1988; Gilman 2001). A highly effective strategy may be the use of authority to divert labor and resources into tasks with collective benefits such as the construction of public architecture, public feasting, or the creation and improvement of agricultural infrastructure (Blanton, et al. 1996; Stanish 2004; Vega-Centeno 2007). Another example is the permanent state of conflict that may put warrior leaders into a position in which their temporary leadership become needed and is ultimately institutionalized (Carneiro 1998).

Even in societies where every member seems to cooperate with leaders or rulers, resistance to authority emerges in contesting power relations, and these omnipresent dissident tendencies and alternative ideologies are important loci of systemic change (Bawden 1995; Eisenstadt 1988; Holton 1987; D. Miller 1989; Paynter 1989; Swenson 2006).

Alternative leaderships are kept under control by the dominant groups when the balance of costs and benefits discourage potential leaders to rebel, encourages loyal followers. If leaders are perceived as capable and effective in achieving the organizational goals of their office, it can discourage competitors to intervene, not because they are not capable, but because they will lack of political support from the collectivity. In such a case, successful attempts to challenge dominant leadership are likely to be related to perceptions that goals have changed or cannot be reached anymore, or a disillusion with the power structure (Kroeber's famous "culture fatigue").

In the engagement in political competition, political actors, in the office or competitors, accept the parameters of the game, while the carriers of anti-system ideologies offer alternative sets of parameters. If one set of parameter is replaced by another, a drastic change in the way power is constructed and practiced will be observable. Assume that ideological constructions and structural conditions around power relations tend to stabilize the system in the short term by keeping small the number of players and making them to comply with hegemonic political ideology encouraging

competition under controlled parameters. *In what kind of conditions, then, do political outsiders and/or marginal leaders bring greater benefits in trying to leverage and break the system with alternative power practices?*

1.2 CRISIS AND COLLAPSE

Societal collapse has long have been a favorite tropes of popular interest and archaeological theory (McAnany and Yoffee 2010a; Tainter 1988, 2006; Yoffee and Cowgill 1988). Older views of collapse as the disappearance of civilizations (sometimes with the people included), or loss of complexity of one type or another, have long been abandoned in favor of more nuanced evaluations of the processes involved in rapid social change (Eisenstadt 1988; McAnany and Yoffee 2010b). Today, prehistorians are likely to gloss “collapse” as the loss or abandonment of established levels of sociopolitical complexity, with replacement by less complex configurations better fitting with new natural and social environments (Marcus 1989; Tainter 1988).

Study of the aftermath of collapse has engendered much more attention as of late. While regional polities disintegrate in smaller units, power resources are decentralized, and new sociopolitical forms and political ideologies may emerge (Bermann, et al. 1989; Conlee 2005; Janusek 2005; Kolata 2006; Marcus 1989; Schwartz 2006). Moreover, a “view from below” inevitably reveals a much more complex process: households and local communities may not necessarily change in the same directions and moments as regional scale organizations, and consequently political disintegration presents variability in the way it affects populations according to their economic and political integration with the structure in demise (Bermann 1994; Kolata 2006; McAnany and Yoffee 2010b; Schwartz 2006). In the study of Late Moche transformation, an alternative to the traditional view of Moche elites adapting to external stress (Shimada 1994), is the argument that rural populations were active agents in the process of power decentralization through the performing of novel and varied ritual practices (Swenson 2006, 2007)

The usage of collapse as a heuristic tool to understand social change falls short in two ways. First, it assumes the disintegration of an already existent highly complex form political organization –most of the cases are state level societies. Second, the term itself is of limited explanatory use to understand why or how people decide to change their behavior. These limitations are quite evident when the concept is

applied to explain the effects at the regional and local scales – such as in the Nepeña Valley– of the disintegration of a pan-Andean religious tradition such as the Cupisnique-Chavín Religious Complex.

The concept of crisis, in contrast, provides a theoretical framework in which agents' behavior can be more fruitfully modeled. The present study draws on the concept of crisis as broadly defined by Seeger (2002) as situations of stress in which high levels of uncertainty and threat or perceived threat are introduced in unexpected and non-routinely way into a system affecting the accomplishing of their main or high-priority goals of the organization, and restricting the amount of time available for response before the decision is transformed (compare with Alföldy 2011; Driessen 2002; Habermas 1975). Among the goals of an organization are biological or cultural reproduction, management of energy –labor and/or resources–, interpretation of reality –ideologies or religions.

Catalysts of crisis can be roughly classified as external or internal according to the involvement of the local population in the generation and development of such factors. External sources emerge from the interaction and connectedness with the surrounding cultural and natural “environment” (Byrne 1998). Natural factors include the usual hazards such as earthquakes, volcanic eruptions and other environmental fluctuations (ENSO, droughts) that introduce stress and threat into the people life, and affect how communities behave interact. External cultural factors may be related to social processes occurring elsewhere, but affecting in particular ways the regions under scope, examples including state breakup, wars and invasions, large scale migrations, etc. Internal factors may be related to technological failure, high levels of exploitation, intensified contradictions, internal power, social, and ethnic struggles, and stem from religious and ideological movements.

Crisis moments may occur at several times in the trajectory of a population, or maybe more or less constant. However, only in some situations does crisis develop into true critical transitions. Not every crisis results in significant transformations of political structure, and not all significant transformations of political structure constitute crises. But there are conditions in which “crisis” change is more likely than others. Consequently, the use of crisis as an investigative framework attempts to identify these periods of transformational change, and also to understand the complex interaction between agents and structure during the resolution stage, while exploring the conditions in which transition to new stable configurations occurs.

1.2.1 Political Crisis, Risk, and Change

In the previous discussion, I noted that leadership, as patterns of power relations, are constructed via the intersection of social relations, and that they are bounded by other people actions, and are relatively stable, at least in the medium term. So when leadership and political structure do change, radically and rapidly, three questions emerge: What conditions permit leaders to exercise structural power and have people to accept them? What are the conditions that permit alternative, innovative, or disruptive behavior to be more acceptable or beneficial? And, what kind of conditions do political outsiders and/or marginal leaders have high benefits to try to leverage and break the system with new alternative power practices?

The “crisis” approach offers two main advantages to the social sciences in exploring such changes (Holton 1987). First, it breaks with functionalist paradigms by recognizing the importance of dysfunctional inter-relations as alternative means for developmental potential. Habermas (1987) describe legitimization crisis when the different sub-systems are impaired in their goals and objectives. He considers this contradiction, and the subsequent compromised resolution, intrinsic to the operating of any complex system. Second, thinking of crisis, rather than collapse, helps us to conceptualize social change as a discontinuous process in time and space, considering change “not the pre-determined result of an evolutionary master-plan, but rather a process mediated through cultural agency and conflict” (Holton 1987:505).

Alternative political discourse and political outsiders are part of the constituency of the society because they are the product of resistance to hegemonic ideologies, and are feed by individual self-aggrandizing motivations. However, allowing and supporting such discourses and individuals constitutes risk in the form of innovation (compare with Fitzhugh 2001). In evolutionary terms, novel strategies allow for diversification of behavior, increasing the potential variance of the expected outputs (Smith 1988; Winterhalder, et al. 1999). This increase of variance not only creates chances of higher returns, but also chances to for lower returns. In other words, innovation can provide to the political system the chance of big rewards, but also big failures, in comparison with the returns from traditional practices (Drennan 2000:183). It is predicted that risk is more likely assumed when current practices cannot provide the means to minimum survival (Winterhalder, et al. 1999:332). In the political arena, a risk-prone behavior – innovation- may be encouraged either when loss can be easily absorbed by the system, or when the current practices cannot provide the means for securing political positions.

Shifts in political behavior and the strategies of political actors not only depend in these actors' ambitions, but also on the cooperation of the rest of the community, including competitors for the same or similar positions. In one approach, people cooperate with leaders when such positions may provide larger benefits to the community as a whole, than would be realized by each household acting autonomously. For instance, in attempts to explain the origin of leadership, Stanish (2004)'s model of conditional cooperators requires ritual practices to naturalize economic relations, and public and physical manifestation of welfare in the form of monumental architecture to continually emphasize and remind people of the benefits of their collaboration. In an alternative approach, people cooperate because the cost of *not* doing so is very high, even if the rulership is undesirable. For instance, Gilman (2001) suggests that high investment in infrastructure and increased conflict may reduce the option of non-cooperation, thus changing the balance of costs and benefits in favor to the acceptance of rulers. Of course, these two contrasting models are based on the primary assumption of rational self-interest; the key difference between the two models is the changing value of the benefits and the costs, and the negligible change of the cost and benefits in each model, respectively.

In the first scenario basic political goals can be reached with recurrent subsistence strategies or political practices, with the current benefits surpass any cost of maintenance. While there is not strong motivation to innovate, some innovation will occur because there is always a desire for higher returns, and, in this case, failures and costs can be easily absorbed by the community. Leaders can lose prestige and authority, but communities are not affected in their normal development. The beginnings of social complexity described for the Formative South Andes (Stanish 2004) and Early Formative Mazatan in Mexico (Clark and Blake 1994) might be seen as fitting such a scenario.

In the second scenario, basic goals are reachable, but the costs have increased. Any attempt to increase the variance may potentially bring significant losses that put under threat political positions as well as community wellbeing. The population lives with the balance of cost and benefits of the current strategies at its edge of profitability. Leaders may try new strategies that may bring higher returns to the community, but if the rest of the people perceive a threat in the innovation, they will not allow or will limit such leader's actions. And it is always possible that leaders will be risk adverse, avoiding situations that put their own position under threat. Also people will not take risky decisions if at least the current situation fulfills their basic needs, even when some elements of their lives are scarcely tolerable such as the rulers in Gilman (2001) model, or the war leaders in Carneiro (1998) model. In both cases, the costs of leadership to the group are high, but higher are the costs of uncooperative behavior, because of the

escalation of intergroup violence. In such situations, the option with lower cost is accepted and this scenario perpetuates the system under marginal benefits.

Sometimes costs rise so high and/or returns diminish so greatly, that nearly any strategies produce negative outcomes. In this third scenario, decisions may be taken to reduce as much as possible the potential losses. Such rationality describes crisis epochs in which the conditions of life changed dramatically and rapidly, and the accomplishment of basic leadership or societal goals is under threat (Alföldy 2011; Driessen 2002; Seeger 2002). Leaders can spend more resources in recurrent practices, but if their effectiveness is diminished, they will only lose prestige and trust. In that situation, novel strategies may increase the potential losses, but also bring the chance to have a better situation in which the current offices can be maintained or slightly improved, with a familiar or comforting social and ideological order being restored. This kind of process helps explain the emergence of cults during crisis (La Barre 1971), as well as the high variance or chaotic tendencies in political behavior in countries with political systems in crisis (Carreras 2012; Mbembe and Roitman 1995).

If human communities are seen as behaving as complex adaptive systems, variability in behavior and network modularity are expected as resilient features in their organization (Holling 2001; Scheffer, et al. 2012). Homogeneity and high connectivity is a configuration resulted only by the implementation of mechanisms of control, coordination and social integration. These mechanisms –hierarchies, bureaucracy, frequent social encounters –are costly in terms of energy, but permit optimal information flow reducing the uncertainty of the decisions (Johnson 1982). It is not surprising that political fragmentation is the feature of processes of societal collapse (Freter 1994; Marcus 1989, 1998). Smaller units are “cheaper” to maintain while keeping the flux of information in optimal parameters at smaller scales (Tainter 1988).

In sum, breakdowns in the things that integrate systems (populations, communities, polities, societies), produce risks and responses of different types. When the loss of integration is in overarching political structure, leading, for example, to conflict among polities, the responses to the crisis will be similar on the part of all actors. The need of political alliances and the need to copy rivals’ successful military strategies can increase the similarity of the solutions. In contrast, when the integrative breakdown is in the ideological realm, responses to the crisis can be much more varied, and are associated with much higher levels of uncertainty. In this case, we would expect communities and their leaders to experiment with varying sociopolitical actions and institutions. As innovative strategies, these get tested over the short term, with the most successful ones persisting and be reproduced by other constituent or competing social units.

1.3 CRISIS AND SOCIAL CHANGE IN THE NORTH COAST: THE NEPEÑA VALLEY CASE-STUDY

Between 750 and 500 B.C. most of the Formative monumental centers that dotted the Andean landscaped were abandoned, part of a wider process of settlement pattern change. Centuries-old forms of social organization and leadership based on religious knowledge and regional elite solidarity were altered. Inter-community interaction begun to show high rates of violence, and, in some areas, high degrees of household inequality developed (Billman 1999; Brennan 1980, 1982; Brown-Vega 2009). This drastic transformation has been interpreted as the result of the disintegration of the overarching Cupisnique-Chavín Religious Complex (described in Chapter 2.0 and the subsequent failure of local communities to find non-coercive ways to interact with neighbors (Burger 1992).

The study of collapse and the following social reorganization has found fertile ground among researchers of later Andean complex societies such as the Moche, Tiwanaku and Wari (i.e. Arkush 2011; Conlee 2003; Janusek 2005; Owen 2005; Swenson 2006, 2007). In these studies, political balkanization, high levels of competition, and political innovation and variability are strongly featured. However, despite intensive archaeological research on the North Coast, there has been little study of the process of reorganization associated with the abrupt end of the Cupisnique-Chavín tradition. During this period, known as the Final Formative Period (Kaulicke 2010), many of the structural foundations of the Early Intermediate Period complex societies known as Gallinazo or Virú, Recuay and Moche, may have developed. These foundations include militarism, the creation of urban settings and demographic centralization, and elite domination of ritual spaces, craft production, long-distance exchange, and agricultural surplus.

This study begins with the premise that the disintegration of the Cupisnique-Chavín Religious Complex originated a series of crisis situations in local political coastal systems. The Nepeña Valley was chosen for study because: a) previous research has documented the existence of occupation during the whole time frame of this research (1200 B.C. –A.D. 500); b) the Formative Period has already been relatively well investigated using traditional archaeological approaches; and c) results of previous surveys suggest dramatic changes during the Final Formative Period.

Societal developments in the Nepeña Valley have often been interpreted in light of external factors, for example: Chavín colonization of the Coast (Tello 1943), labor demands from the Casma Valley during the Initial Period (Daggett 1987), or Moche invasion and highland Recuay expansion (Proulx 1982). These perspectives have been based mostly on pottery and architectural styles, and there has been little effort made to trace continuity and changes through time in the valley using other lines of evidence.

The most substantive regional work until my own was the survey done by Proulx and Daggett (Daggett 1984; Proulx 1968, 1973, 1985). Proulx's survey relied heavily on standing architecture in reconstructing settlement patterns, and as one goal was to create a ceramic sequence, emphasis was on collecting diagnostic pottery (Proulx 1985). Daggett (1984) carried out a complementary survey focused on Early Horizon occupation (Late and Final Formative Periods).

Subsequent research was sporadic and limited, including that of Samaniego (1992) and Bischof (1997), this last identifying Cerro Blanco de Nepeña as an Early Horizon U-temple site. Meaningful excavations of Formative period sites only began very recently, with work at Huambacho Viejo, Cerro Blanco de Nepeña, Huaca Partida, and Caylán in the Lower valley (Chicoine 2006a, 2006c; Chicoine and Ikehara 2010; Helmer, et al. 2012; Ikehara, et al. 2013; Ikehara and Shibata 2008; Ortiz Zevallos 2012; Shibata 2010, 2011), and Kushipampa (Ikehara 2010a) in the Middle valley. While confirming some of the chronological assessments made by Daggett (1984), this more recent work also called into question how the Cupisnique-Chavín phenomena and its disintegration in the valley have been perceived.

To situate my study in the context of previous archaeological research, I will first describe the current understanding of Formative Period sociopolitical trends in the Lower Nepeña Valley, and then sketch the understanding of trends in the Middle Valley prior to my research.

1.3.1 The Late Formative in the Lower Nepeña Valley

During the Late Formative Period, when many centers in the lower Valley were abandoned, two centers in the Nepeña Lower Valley were not only maintained, but also enlarged by episodic rebuilding. These centers, Huaca Partida and Cerro Blanco de Nepeña, had pottery assemblages and mural art with Cupisnique-Chavín iconography, and architectural features that resemble Cupisnique (North Coast) and U-shaped temple (Central Coast) traditions (Shibata 2010; Vega-Centeno 2000). One interpretation for the growth of these sites is the local strengthening of a sociopolitical order built on the Chavín-Cupisnique cult (Shibata 2010). These centers may have functioned as integrative nodes in which an otherwise dispersed population periodically gathered for ritual purposes (Dillehay 2004; Ikehara and Shibata 2008)

By the end of the period, a parallel and competing ideology emerged in the lower Valley. This new tradition was characterized by architectural canons and spatial patterns that contrasted dramatically with Cupisnique-Chavín centers. Unlike the relatively isolated locations, small resident populations, and open spaces for public ceremonies found at Cerro Blanco de Nepeña and Huaca Partida, the new centers of Caylán, Huambacho Viejo, Samanco, and Sute Bajo consisted of large residential settlements, with small, agglutinated communal spaces. Similar domestic and fine pottery were found at all these sites, but Cupisnique-Chavín decoration was entirely absent from the latter centers, suggesting a conscious rejection of the Cupisnique-Chavín iconography and ideology, and that leadership was built on different concepts and activities (Chicoine 2010b; Ikehara and Chicoine 2011). The most plausible interpretation is that these differences were part of separate sociopolitical configurations, with communally-oriented ceremonial leadership and weak social ranking represented by the Cupisnique centers, in contrast to centers such as Huambacho, with its evidence of ritual practices emphasizing internal social differentiation and fragmentation (Chicoine 2011; Ikehara 2007).

1.3.2 The Final Formative in the Lower Nepeña Valley

The Cupisnique-Chavín network disappeared from the valley during this period, and the Cerro Blanco de Nepeña and Huaca Partida centers were abandoned. In contrast, the centers of the younger local tradition flourished, and a settlement hierarchy can be recognized for the lower and middle Valley sections, with Caylán with its nearly 80 ha at the apex (Ikehara and Chicoine 2011). The presence of a set of highly similar, monumental enclosures at Caylán could suggest a basal segmentary social organization, or even competing elite factions. In a fine-grained analysis, Chicoine (2010b, 2011) argues that ritual spaces in Huambacho were used in “multi-layered events,” emphasizing group integration, internal social division, and leadership competition. He contends that plazas were the focus of community integration, while the differential access to different spaces such as upper-level benches or secondary rooms emphasized social divisions; the whole thus reproducing relations of power and authority. That the multiplicity of plaza compounds in Huambacho and Caylán reflects multiple community leaders competing for support and authority, is furthered by the evidence in these spaces of repetitive, diacritical feasting (Chicoine 2011; Helmer, et al. 2012). The storage facilities (small rooms adjacent or in patio rooms) documented at the sites would have been used in support of such activities (Chicoine 2006c). In this construct of network strategies of political leadership, Chicoine (Chicoine 2010b, 2011) cites commensal hospitality (feasting) as essential to faction-building, and the creation/use of effective political

spaces in creating leadership. He notes that as the monuments expanded, additional small spaces were constructed, rather than the enlarging of public spaces, indicative of the fragmented political leadership at these centers.

1.3.3 The Middle Valley Research Zone: A Different Trajectory

The Middle Valley was characterized by very different developments during the Late and Final Formative Periods. Previously, it was not possible to situate these developments in a temporal framework, but this changed with a newly refined local ceramic sequence (Shibata 2010). Using this sequence, it became possible to recognize that most of the sites assigned by Daggett (1984) to the “Early Horizon” should be assigned to between 800 and 200 B.C., and it became possible to reliably distinguish Late from Final Formative Period occupations with ceramic assemblages. The current evidence for the Cupisnique-Chavín Religious Complex in the Middle Valley was scant before my research. In place of the development of a settlement hierarchy dominated by a couple of massive centers, as happened in the Lower Valley, the Middle Valley Final Formative Period population growth and nucleation was associated with the appearance of numerous ceremonial centers such as San Juan (PV31-47), Kushipampa (PV31-56), Huancarpón (PV31-59), Paredones (PV31-64); Virahuanca Bajo (PV31-351), and Anta (PV31-170) (Ikehara 2010). The public architecture at these centers differs markedly from the Lower Valley traditions, consisting of huge open spaces surrounded by high walls. And these centers lack the redundant, small ritual spaces of the Final Formative Lower Valley centers such as Huambacho and Caylán. Despite some similarities among the Middle Valley centers, previous research clearly revealed significant differences among them in size, layout, plaza/compound sizes, potential public/communal storage spaces, distributions of fine wares, as well as in residential patterns.

The earlier Proulx (1985) and Daggett (1984) work, and my own pre-dissertation reconnaissance, also documented other forms of Late and/or Final Formative settlement, including numerous fortified hilltop sites, many smaller public or residential sites, and (in the case of my pilot work) significant occupation represented only by thin or dispersed sherd scatters.

1.4 RESEARCH QUESTIONS

The present research focused on understanding of the construction and transformation of leadership strategies and their manifestations in the Middle Nepeña Valley between 800 B.C. and A.D. 500. I hypothesized that the crisis generated by the disintegration of a pan-regional Cupisnique-Chavín Religious Complex (CCRC) religious ideology around 500 B.C. would have created a situation in which many alternative “leaderships” sprung up. In addressing this issue, there were four potential scenarios to be assessed (Figure 1-1):

1) The Cupisnique-Chavín Religious Complex was not a part of leadership or political authority in the Middle Nepeña Valley relations during the Late Formative Period (my Period I) to begin with. In this case, its disintegration would have been of negligible direct influence on the changes – if any– occurring during the Final Formative Period. In other words, there was no 500 B.C. crisis in the Middle Valley.

In the Lower Valley, the local Caylán tradition developed in the latter half of the Late Formative, unhampered by the disappearance of the CCRR around 500 B.C. To the contrary, the disappearance of the CCRR seems to have created a vacuum in the Lower Valley that facilitated the subsequent growth of the Caylán tradition (Chicoine and Ikehara 2010; Ikehara and Chicoine 2011)

2) The Cupisnique-Chavín Religious Complex was part of Middle Valley life in the Late Formative, but, as in the Lower Valley, some alternative leadership traditions were already present. As in the Lower Valley, these alternative practices may not have changed in the Final Formative Period.

3) The Cupisnique-Chavin ideology was an essential part of the exercise of leadership during the Late Formative Period in the Middle Valley. Its disappearance would be a cause of, or sign of, a crisis in which traditional political strategies and institutions were weakened, and political innovation (leadership) stimulated. I knew before doing this research that the abandonment of Cerro Blanco de Nepeña and Huaca Partida in the Formative Period might be in keeping with this scenario. The degree of systemic integration during crisis resolution may create two sub-scenario possibilities:

3a) if systemic integration was maintained, a restricted set of novel practices emerged and were replicated by the constituent social units.

3b) if systemic integration was broken, a variety of novel practices emerged and developed in parallel until a few of them became more successful than others in acting to consolidate stable configurations of power. These strategies were replicated by competing groups.

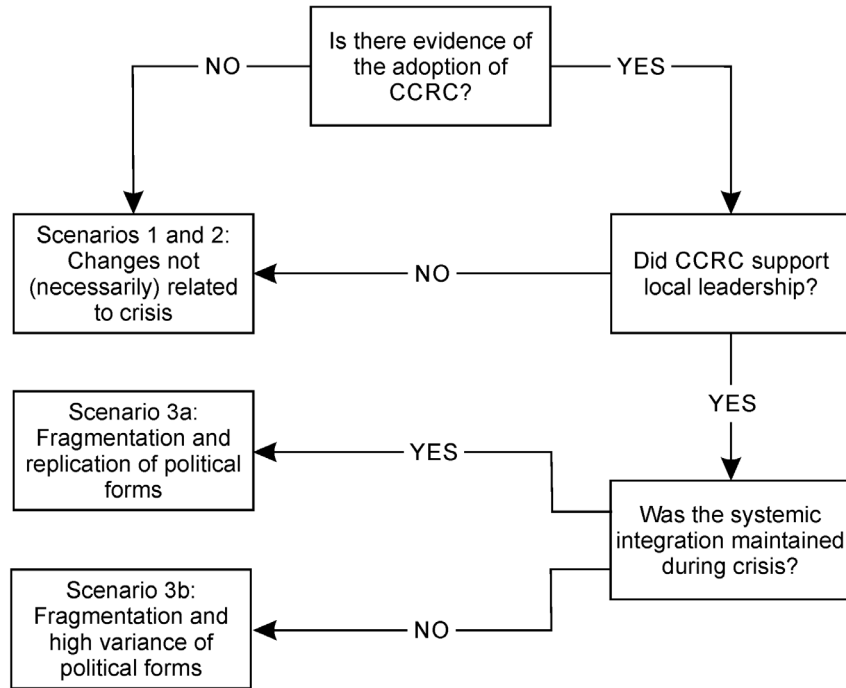


Figure 1-1 Potential scenarios assessed in this research.

Evaluating these scenarios required information on demographic and settlement processes and the locations and activities of likely leadership households. This research was organized around addressing a several research questions.

1.4.1 Research Question 1

How was the Middle Nepeña Valley population distributed? How did the size and distribution of the population change though the Formative Period and Early Intermediate Periods?

The scale, distribution, and density of the population affect the intensity and frequency in which social interaction occurs because distance influences strongly the cost of the interactions, in special in those societies with pre-modern communication and transportation technological regimes (Drennan and Peterson 2012). Demographic factors are also fundamental to understanding the potential and limitations of certain political strategies and the nature of political competition. For example, factional competition is less likely when only a few dozen households share a large area. On the other hand, integrating thousands of people may require complex forms of organization in which segmentation and hierarchies feature.

The relationship between available resources and population density is an important factor in the development of specific economic systems. The imbalance between locally available food and people requires the development of exchange and tributary systems (Nicholas 1989; Steponaitis 1981), while an uneven distribution of a variety of resources or productive activities may be propitious for the development of redistributive systems, and/or market economies (Feinman, et al. 1984). Moreover, aggregation of population in large numbers is one of the features that define village life (Bandy and Fox 2010). With aggregation, and higher demographic densities, new matrices of interactions are created in which leadership is constructed, and a larger pool from which leaders can draw social and economic support for political competition. Leaders of local communities can expand the influence of their authority, incorporating neighboring groups, and forming supra-local communities. Archaeological collapse is usually characterized by a decline in the degree of political integration, and, in some cases, a decline in population.

1.4.2 Research Question 2

What kinds of communities or territorial units existed in the Middle Nepeña Valley and how were these integrated? Was there regional centralization, economically, politically or ceremonially at any time?

Given an archaeological record of monumental centers, residential villages, and dispersed population, an initial goal has to be determining the nature of communities and groupings above the village level. These groupings, which I'll refer to as "supra-local communities," can be seen in regional population clusters. In many cases, these can be viewed as small scale polities, but the word "polity" implies a unitary political structure that may not be there. Integration of a supra-local community is provided by interactions that connect the members of the supra-local community to other members of the supra-local community. A supra-local community may be integrated in various ways, through political rule, social hierarchy, public ceremonial or mortuary activities, warfare, or economic interdependence.

Structurally, supra-local community integration can vary along a continuum from segmentary to unitary (de Montmollin 1989a). A segmentary supra-local community would be characterized by a low degree of centralization, and the existence of multiple equivalent settlement units. There would a low degree of functional differentiation (politically and economically) among these constituent units, which are loosely integrated by mechanical solidarity –i.e. by kinship relations and political affiliation. An example would be a confederation of lineages. In contrast, a unitary supra-local community would be

characterized by a high degree of centralization, as seen functionally in the settlement system. Such a supra-local community, for example, might display strong settlement hierarchy, a dominant central place, or a well-integrated rank-size pattern.

Spatially, activities such as craft production, ceremonial activity, trade, wealth accumulation, or surplus accumulation can be distributed in different ways among the settlements forming a supra-local community. The degree to which these centers of these activities coincide spatially provides clues as to the nature of hierarchy and integration of the supra-local community. For example, when the centers of these activities do not coincide, it suggests the possible existence of multiple parallel hierarchies or leaderships (Crumley 1995), or that leadership was connected to only certain activities.

1.4.3 Research Question 3

Where were leadership households (households of high status or wealth) located in the Middle Nepeña Valley? What activities were associated with these households? How did these change through time?

Social hierarchy can take different forms, of which economic inequality is only one (Blanton, et al. 1996). And leadership can lie in economic, social, and ideological domains. Working from the assumption that households of higher status/wealth are more likely to play leadership roles in society than other households, one goal of the research was simply to determine where such households were located relative to ceremonial centers, fortifications, population clusters, agricultural features, and natural resources. Spatial relationships can indicate when such households were differentially involved in, for example, public ceremony, or utilization of the most fertile agricultural soils. Analysis of the artifact assemblages from such households should reveal which activities (economic, social, ritual), were associated with leadership (high status/wealth), including such possibilities as craft production, staple production or accumulation, exchange, feasting, and ritual.

1.4.4 Research Question 4

What were the similarities and differences among public architecture centers, and how did these change through time?

Public architecture is the reflection of power relations in a society (Feinman 2010; Moore 1996c; Trigger 1990). Not only are they the result of the management of material resources and energy, but they

also is the setting in which power relations are negotiated. Multiple redundant ritual spaces are an indicator of multiple equivalent segments within the community using the space, as described for the Lower Nepeña Valley's Huambacho (Chicoine 2011). Functional differentiation, so as variation in the size or public spaces or in access to them, may indicate hierarchical aspects of how the spaces are utilized, as described for Late Formative Period Huaca de los Chinos in the Moche Valley (Pleasant 2009). Differences between the scale of the ritual and the scale of the surrounding population suggests the degree of ritual integration of the supra-local community. Spaces designed to serve a supra-local, as opposed to simply local, community should accommodate the population of the former.

Variability in public architecture across space and through time also provides insights into diversity in leadership practices and ritual authority (Swenson 2006, 2007). Shared architectural canons are likely to reflect uniformity in ceremonial activities, stemming from a common dogma, or an overarching religious authority. For example, we could hypothesize that if the Middle Valley population was strongly integrated around leadership supporting by the Cupisnique-Chavín ideology, ceremonial spaces would exhibit standardized architecture consistent with that found in the Lower Valley and other regions. After the crisis, if religious integration was maintained across the Middle Valley, we would expect to see a common public architecture tradition, whether new or following earlier traditions. On the other hand, if valley-wide ceremonial integration was lost and local leaders sought to bolster their authority through religious claims, we would expect to see the emergence of a diversity of public architectural forms and canons, much as Swenson (2006, 2007) observed in the Moche Valley in the Late Moche Period.

1.4.5 Research Question 5

Were changes in the nature or level of conflict associated with either crisis?

The current archaeological evidence points to conflict increasing substantially in the last part of the Late Formative and into the Final Formative Periods along the coast of Ancash (Brown-Vega 2010; Chamussy 2009; Daggett 1984; Ghezzi 2006; Ikehara and Chicoine 2011). Whether there were similar changes in the Middle Nepeña Valley was something to be explored.

Hypotheses about the development of warfare and its relation to political change include Carneiro's (1970) classic model which posits that population increase in a socially or geographically circumscribed environment creates competition over limited available resources. A village subdues its neighbor, and a supra-local polity (chiefdom) is formed. Subsistence stress is the catalyst for this conflict.

Later he (1998) argued that warfare would provide a justification for ambitious war leaders to make their authority permanent (Carneiro 1998). A number of other investigators have proposed that political competition is a significant factor in the escalation of conflict (Allen 2008; Arkush 2008; Redmond 1994; Webster 1998). Is there evidence for internecine warfare in the Middle Nepeña Valley? Does it accompany diversification of leaderships and political competition, or is it associated with demographic changes? Finally, external threats can be another factor for centralization and militarization, as noted by specialists in the Andean region (S. Pozorski and Pozorski 1987; Wilson 1987).

1.4.6 Research Question 6

How important was the Cupisnique-Chavín Religious Complex to leadership in the communities of the Middle Nepeña Valley initially? How was its disappearance manifested locally? Did any of its iconography or practice continue in use?

This research was intended to deal not only with local trajectories, but also to learn more about the role played by the Cupisnique-Chavín Religious Complex in leadership on the coast. Addressing these questions entailed determining the location of CCRC materials or architectural canons in the Middle Nepeña Valley, and investigating how these materials related to exercise of authority or leadership.

2.0 ENVIRONMENTAL SETTING AND HISTORICAL CONTEXT

2.1 ENVIRONMENTAL SETTING

2.1.1 Physical and Modern Human Geography

The North Coast of Peru is a desert strip extending north-south along the coast, and east to the foothills of the Andes Mountains. The dry landscape is broken by alluvial valleys formed by rivers feed by rain, lake and/or glacial reserves from the highlands. These rivers run westward, discharging their waters into the Pacific Ocean. Most river valleys are separated from others by mountain ranges and desert patches of sometimes dozens of kilometers that make difficult the inter-valley movement of people.

The Nepeña valley is located 350 km north of the modern city of Lima. It is neighbored by the Lacramarca and Santa valleys at north, the Casma valley to the south, and the Cordillera Negra to the east. Above the *cordillera*, the Upper Santa valley -which runs north-south- is referred as the Callejón de Huaylas. Today, the coastal valleys are connected by the Pan-American Highway which runs parallel and in proximity to the seashore. Secondary roads connects Nepeña valley with highlands cities in the Cordillera Negra such as Pamparomás, and in the Callejón de Huaylas such as Caraz and Yungay. It is very likely that during pre-Hispanic times, settlements were also connected by north-south inland paths, now mainly in disuse.

The valley bottom of the Nepeña River has a length of approximately 74 km east-west, and a maximum width of 8 km, and it is delimited north and south by mountains, dry alluvial fans and dry gullies (Gambini 1984:15; ONERN 1972:36). In his research, Proulx (1968) divided the valley into lower, middle and upper sections. The present research revises these divisions, in accord with the way this has been done for other similar valleys (i.e. Schreiber and Lancho Rojas 2003; Wilson 1988).

The Lower Valley covers the territory between the seashore and the narrowing of the valley in the Kiske area (at 290-300 masl in the valley bottom, southeast of San Jacinto). It has a length of approximately 30 km and it includes Proulx's lower and middle sections (Figure 2-1). The Middle Valley

includes the Moro Pocket -which begins after the narrowing of Kiske- (Daggett 1984; Proulx 1968) and the Jimbe area (around 1000 masl in the valley bottom). The Middle Valley has a length 23 km. and is equivalent to Proulx's upper section. Finally, the Upper Valley includes the territory in the Cordillera Negra (up to 4500-5000 masl), where the Nepeña River system has its origin.

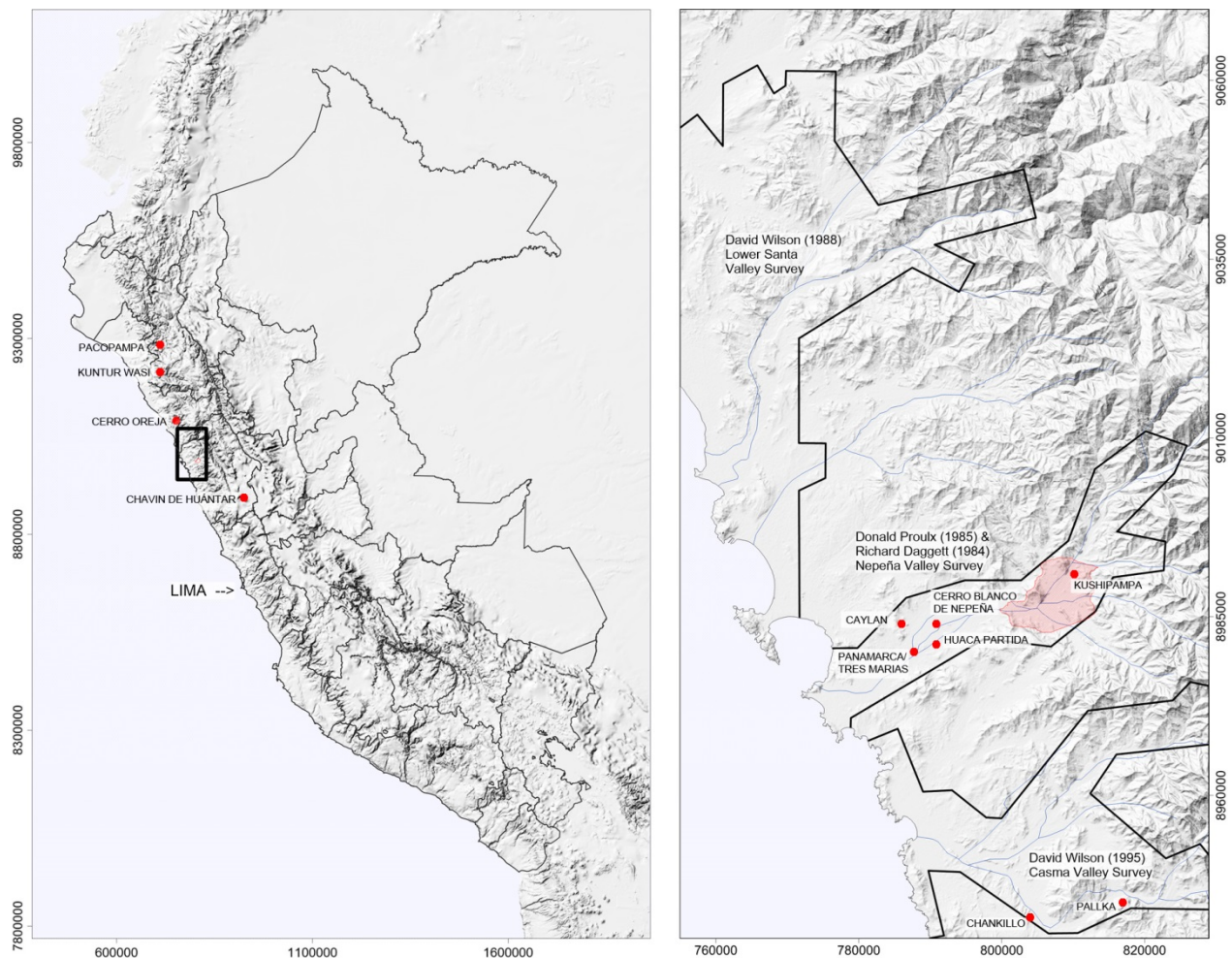


Figure 2-1 Map showing the location of the regional surveys, major archaeological sites cited, and the area of the present investigation (in pink).

In the Lower Valley, most of the land is used for the cultivation of sugar cane by *Agroindustrias San Jacinto*. In the Middle Valley, agricultural production is more varied and includes sugar cane, fruit trees, mainly mango and avocado, manioc, sweet potato, maize, chili pepper, among others, in combination with limited cattle rising. The Upper Valley lands are used mainly for maize and fruit trees. My own observation is that now communities in the littoral are only partially fishing oriented, and their products arrive as far as the Moro pocket for daily consumption. The concentration of agricultural land

has a long history in the valley (AMCRP 2008). Before their expulsion from the New World territories by the Spanish Crown, the Society of Jesus controlled a valley hacienda, and afterwards it was privately owned until its nationalization during the military government by the end of the 1960's (AMCRP 2008; Samaniego 1992). During this time investment in agricultural infrastructure, such as the expansion of irrigation systems, may have been high, however little documentation related to such improvement can now be found.

Modern population is estimated at around 33,000 people in the four districts in which the Nepeña valley is subdivided: Samanco, Nepeña, Moro and Cáceres (Municipalidad Provincial del Santa 2012). Nepeña and Moro together have around 23,000 people, mostly living in the main towns of Nepeña, Cerro Blanco, San Jacinto, Motocachy and Moro.

2.1.2 Precipitation and Hydrology

The dryness of the Peruvian coast is caused by the influence of the Humboldt Current cold waters. The cooled air masses coming from the ocean are warmed by contact with land masses, increasing the capacity to hold moist content, and avoiding the release of moisture until the contact with the Andean mountains (Shimada 1994:44). This situation shifts periodically when the tropical warm waters from the north move south producing increased rainfall. This phenomenon, known as El Niño Southern Oscillation (ENSO), and its impact in human population has been widely studied (i.e. Moseley 1987; Shimada, et al. 1991; Van Buren 2001).

The territory between the seashore and the highlands at 1700 masl receives in average of 80 mm of total pluvial precipitation annually. The amount varies increasingly eastward, being 17 mm in average below 600 masl, and 143.3 in average in areas around 1000 masl. (ONERN 1972:48), being insufficient to support dense vegetation cover and/or rain fed agriculture. In contrast , in the zones over 1700 masl total annual precipitation averages between 380 mm in the lower elevations and 1000 mm at 4800 masl. This regime is seasonal, with the maximum precipitation between the months of October and May, and a dry season between June and September. When temperature and soil are adequate, this environment can support vegetation cover and rain fed agriculture during part of the year. Consequently, techniques to extend water availability (i.e. reservoirs), social and/or physical storage, or the colonization of different ecological niches may have been required to support long term sedentary populations in this territory (Halstead and O'Shea 1982; Lane 2009; Murra 1985; Stanish 2011).

The precipitation on the western slopes of the highlands and natural water reserves are the origins of the several rivers that cut through the desert coast. The Nepeña is a second class river: its origin are not in the continental divide, but in tributaries from the zone where precipitation is high (Proulx 1968:2). The Nepeña system is composed of several rivers that extend over 1900 km² (ONERN 1972). In the northern section of the system, the Lampanin, Ticlla and Colcap Rivers join to form the Jimbe River around the Jimbe town. In the south, the Uchupacancha, Huarapampa and the Chunya Rivers merge to originate the Larea (or Salitre) River. Both Salitre and Jimbe join to form the Nepeña River near Captuy town. The Nepeña River is also feed by the Loco (or Vinchamarca) River around the Kiske zone before reaching San Jacinto town.

The Nepeña river regime is cyclical, and it strongly depends on the highland seasonal rains (ONERN 1972). Its average water loading is 2.14 m³/sec, but it is highly irregular during its annual cycle. Between January and March (the wet season) the river discharges its 57% of its annual volume, and maximum daily loading, as high as 80 m³/sec, have been recorded, while minimum records, as low as 0.02 m³/sec have been recorded during the dry season; a period in which only the 22% of its annual volume is discharged. The sudden increase of river water loading can have disastrous consequences in the local population. The destruction of hundreds of hectares of crops can occur during the swell epoch. The Loco River ("Crazy River") takes its name from its irregular and torrential character during such periods. The riverine area is of high risk for flooding during the wet season, but it is also an area of potentially higher moisture during the dry one.

The amount of water provided by the Nepeña River is small in comparison with rivers in neighboring valleys. The total annual discharge is only of 74.7 million m³ in average, while Santa River average annual discharge is 4594 million m³, and the Casma system of 172.4 million m³ (Wilson 1988: Table 1). Despite the volume of the Santa River system, less than 10% of its waters is used because the topography of the terrain makes the canalizing its waters a difficult task (Wilson 1988:27). In contrast , the gently slope of the Nepeña valley makes easier the exploitation of surface and subsurface water (with wells) and most of the Valley's 8800 ha of cultivable land can be irrigated (data for 1972 from ONERN 1972:223).

The subsurface water reserve is an important complement to river water in modern agriculture in the valley. The ONERN (1972) report mentions the existence of 7 springs. However, around 20 were known to exist before the intensive exploitation of the water table started fifty years ago. Some modern reservoirs such as Caylán, Captuy, or Motocachy may have been built in places with natural subterranean

water upwellings. Current use of subsurface water for domestic and agricultural use is made possible by the construction of dozens of wells.

2.1.3 Ecological Variation

Ecological variation is highly correlated with precipitation, topography, temperature, and altitude. Two main ecological life zones, Holdridge's classification, are found in the Lower and Middle Valleys (ONERN 1972): the Premontane Desert and the Premontane Desert Scrub. Local ecological variability due to both natural and human factors was been observed during fieldwork and is described below.

The premontane desert extents from the seashore to 600 masl, where total annual precipitation ranges between 17 to 100 mm. Annual average temperatures range between 18°C to 22° C, while minimum temperatures are rarely below 13°C. This life zone is comprised of two kinds of terrains. The first terrain includes valley bottoms and dry pampas, each varying from flat to slightly hilly, and are of alluvial and aeolian origin, with soils of variable texture, variable depth, and medium fertility. The second terrain includes the semi rugged dry pampas and hills, which are residual formations with superficial soils of variable texture and medium to low fertility.

Today, this life zone sees intensive mechanized agriculture of mainly sugar cane, but the original natural vegetation was composed mainly of xerophytes such as *achupaya* (*Tillandsia* sp.) whose density diminished with altitude. Areas with increased moisture by water upwelling are surrounded by hydrophytes and halophytes such as *grama salada* (*Dystichlis spicata* and *Salicornia* sp.) and plants of the Cyperaceae family (i.e. *Cyperus* sp. and *Scirpus* sp. –*Juncos* and *totoras*-). More dense vegetation of giant grasses such as *caña brava* (*Gynerium sagittatum*) and *carrizo* (*Phragmites australis*) are found close to water sources (reservoirs, springs, water canals or garden plots). The relics of ancient dry forest, mainly of *huarango* (*Acacia acracantha*), *algarrobo* (*Prosopis chilensis*), *molle* (*Schinus molle*), willow (*Salix chilensis*), *caña hueca* (*Arundo donax*) and shrubs, are scattered across the valley floor.

The Premontane Desert Scrub extends around the Moro and Jimbe area (500 -1900 masl), having a subtropical dry climate due to its total annual precipitation between 100 and 250 mm, and an average temperature of 24°C - 26°C. Three zones can be differentiated. The first zone is a continuation of the valley bottom, the second includes the agricultural terrain in the piedmont and gullies, and the third is in the arid mountains. The soils are of alluvial and colluvial origin in the agricultural areas. In general, these soils have medium to low fertility, and a predominantly coarse texture. The vegetation is dominated by cactaceae such as *giganton* (*Cereus microstibas*, *Echinopsis cuzcoensis*) and *candelabro* (*Cereus*

candelaris). In the dry ravine is huarangos (*Acacia acracantha*), and along the river edge and around other seasonal water sources are molle (*Schinus molle*), willow (*Salix chilensis*), tara (*Caesalpinea tinctoria*), and a variety of weeds.

My personal observation during fieldwork is that there is noticeable seasonal variability in the Middle Valley connected with the growth of *lomas* vegetation. During the highland raining season, some usually dry gullies such as El Arenal, accumulate sufficient moisture for vegetation to appear. In other areas of the Moro pocket, the water table rises and moisten the surface. In the low lying riverine area, cultivation can become risky, and swampy areas get inundated.

In lands around 500 masl, I have seen vegetation that resembles *lomas* formations. It grows during the winter, when humidity is at maximum and moisture precipitates during the morning or the night. In addition to the cactaceae that characterize this life zone, and achupayas (*Tillandsia* sp.), seasonal plants such *Nolana* sp. and wild tobacco (*Nicotiana* sp.) sprout in the hills. People in Moro town report the greening of the top of some hills and slopes during this epoch.

2.2 SOCIOPOLITICAL TRAJECTORIES OF THE NEPEÑA VALLEY IN ITS REGIONAL CONTEXT BETWEEN 1200 B.C. AND 500 A.D.

This section outlines the general chronology observed in the Nepeña Valley in the wider context in the Central Andes between 1200 B.C. and 500 A.D., based on the current state of archaeological research. The temporal framework for the Formative Period (**Error! Reference source not found.**) follows the general scheme proposed by Kaulicke (2010) and the Nepeña local sequence created by Shibata (2010). Both sequences were built on observing changes in architecture, ceramic assemblages and iconography from controlled stratigraphic contexts.

2.2.1 The Middle Formative Period: 1200-800 B.C.

During the Final Archaic Period (2600-1500 B.C.) and the Early Formative Periods (1700/1500-1200 B.C.) the Central, North-Central and North Coast of Peru (Figure 2-1) was the loci of the emergence of complex polities able to mobilize labor pools, implement hydraulic infrastructure, and build massive mounds and large plazas for ceremonial purposes (Billman 1999; Burger 1992; Kaulicke 2010). During the following

period, known as the Middle Formative (Kaulicke 2010), some communities continued with similar economic and political patterns, while others increased in the complexity and scale of their political organizations.

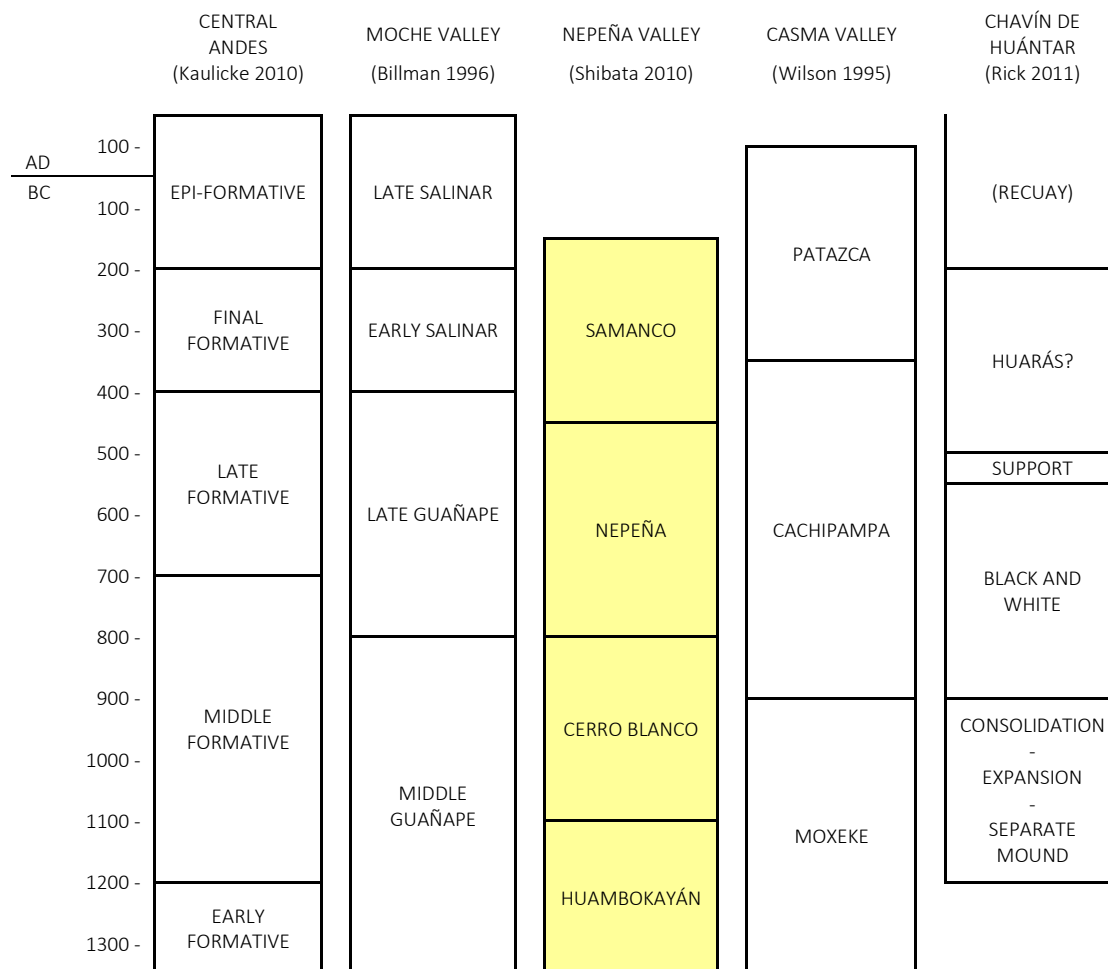


Figure 2-2 Comparative sequences for the Ancash Formative Period.

In the Casma Valley of the north-central coast, between 1800 and 1200 B.C. local communities were organized into large supralocal communities that built what were very likely the largest mounds in the Central Andes until the construction of the Moche capitals (S. Pozorski and Pozorski 1987, 2002, 2006). The concentration of monumental architecture in the Casma valley, seems to support the hypothesis that a state level polity -or polities- mobilized the labor from the neighboring valleys such as Nepeña and Santa (Daggett 1984). In the Nepeña valley, evidence of interaction with Casma have been found in among the fishing hamlets in the seashore such as Los Chimus (S. Pozorski and Pozorski 2006), the Huambocayán stage in Cerro Blanco de Nepeña -with sherds resembling Las Haldas phase- (Shibata 2010), and the Kushipampa stone lintel -carved after the Sechín style- (Ikehara 2010a).

Along the North Coast and part of the north and north-central highlands, the populations in each of the narrow valleys were divided into several supra-local chiefly communities (Stanish and Haley 2005), of moderate sizes and differing complexities. Leadership emergence may have been rooted in kinship relationships that may have featured in faction constitution (Ames 1995; Brumfiel 1994). The instability of positions based in charisma or exposed to frequent contestation, would likely have led to continued reinforcing activities through socially integrative practices, such as ceremonies and rituals (Clark and Blake 1994; Dillehay 2004; Sahlins 1963). Managerial tasks, such as the coordination of labor, and ritual may have been intrinsically linked together since earlier times (Vega-Centeno 2007), but this local basis of political power may have also limited the extent to which power relations could be centralized, and the degree in which social inequalities could be created and institutionalized (Earle 1997; Spencer 1994).

During the Middle Formative, a religious ideology described in this research as the *Cupisnique-Chavín Religious Complex* (CCRC) emerged in the network of North Coast communities (Elera 1997; Kaulicke 2010; Onuki 2001a). Its imagery and symbols, based in the representation of predators, felines, raptors, and reptiles, or the combination of representative parts of them with anthropomorphic beings, were displayed in monumental architecture and fine ceramics (Elera 1997; Kaulicke 2010; Larco 1941). This association has been interpreted as the iconography of a shamanistic ideology and leadership (Burger 1992:95), which emerged in the intersection of those local networks of social relations, and through participation in a multi-regional network of elite solidarity.

The systemic integration of such communities was continually reproduced by rituals carried out in the architectural complexes that dotted the landscape of each valley (Dillehay 2004; Ikehara 2010; Ikehara and Shibata 2008). These ceremonial complexes were formed by the combination of rectangular platforms with decorated façades, squared plazas, and hypostyle halls, arranged symmetrically in a linear way, or with a “U” layout (Burger 1992; Pleasants 2009; T. Pozorski 1975; Sakai and Martinez 2010; Shimada and Elera 1982). The hierarchical distribution of public spaces has been interpreted as an indicator of social inequality among the members of the community during ritual episodes (Pleasants 2009). In some valleys, such as the Moche Valley, a three-tier hierarchical settlement system suggests a more permanent state of such complexity (Billman 1999). However, the settlement data from other regions is not as strong in that respect. Indeed, the distribution and size of many ceremonial centers along the North Coast suggest a varied and fragmented political landscape during most part of the period (Burger 1992:98), and the few excavated cemeteries do not suggest high degrees of social inequality among community members (Elera 1998).

The similarities in iconography, in elements, style, and composition, are a strong indicator of the sharing of beliefs between communities in a wide region that has been described as the Great Cupisnique area ("El Gran Cupisnique" in: Kaulicke 2010:397-398). However, interactions and practices inside the broad network area were not homogeneous. To cite one simple example, regional emphasis is detectable in the popularity of some images, such as the spider image around the Jequetepeque area (i.e. Sakai and Martinez 2010). And some locales show no articulation with Cupisnique-Chavín at all.

The presence of Cupisnique-Chavín Religious Complex ritual practices in the Nepeña Valley is manifested most strongly in two ceremonial complexes. During the Cerro Blanco phase, Cerro Blanco de Nepeña and Huaca Partida were the central places of the sociopolitical life of the lower valley communities (Shibata 2011). While Cerro Blanco de Nepeña's layout is not clearly defined for this phase, Huaca Partida resembles a typical Cupisnique center with a symmetrical arrangement of mound, patio and hypostyle hall. Both buildings, built with conical and conic frustum adobes, displayed richly decorated mud friezes bearing images and composition resembling those of the architecture of Chavín de Huántar itself, as well as other Cupisnique sites such as Huaca de los Reyes (Bischof 1997; MAAUNMSM 2006; Shibata 2010; Vega-Centeno 2000).

2.2.2 The Late Formative Period: 800-500 B.C.

Around 800-750 B.C, after hundreds of years of continuous use and rebuilding, many of the monumental centers of the North Coast and the Central Coast were abandoned. This abrupt transition has been labelled the Coastal Crisis (Burger 1992:184-190) or Coastal Blank –*vacío costeño*- (Onuki 2001b:122). This abandonment was interpreted by Burger (1992:189) as part of a legitimization crisis involving the ideology underlying the construction of such monumental architecture and the associated iconography. Internal contradictions may have resulted from the attempts of local coastal leaders to accumulate wealth and institutionalize coercive power relations based on the control of sacred knowledge within communities in which persisted a strong egalitarian ethos.

For decades, archaeological research struggled to find Late Formative Period settlement in the North Coast, and, as a consequence, hypotheses of migration up valley or from the adjacent highlands have been proposed (Onuki 2001b). This idea is partially supported by the discovery, in the highland center of Kuntur Wasi, of human remains affected with auditory exostosis, an abnormal bone growth caused by the repetitive exposure to cold water and wind, normally associated with fishermen populations (Onuki 1995).

The abandonment of the major coastal ceremonial centers was concomitant with a florescence of the highland communities. Highland groups carried out projects to enlarge their ceremonial centers, and many of them were maintained centuries later than their coastal counterparts (Burger 1992).

Chavín de Huántar is the best known example of these highland centers. It received its last large remodeling during the Black-and-White stage, in which a facade covered by rich iconography was added to the existing Middle Formative buildings (Kembel 2008; Rick, et al. 2011). In the North Highlands, centers such as Kuntur Wasi and Pacopampa, founded during the Middle Formative, continued in use and major rebuilding was carried out at each (Inokuchi 2010; Seki 2010). The integration and prosperity materialized in the investment in these centers may be reflecting the consolidation of local leadership under the Cupisnique-Chavín ideology.

It is easy to describe the architecture of the Cupisnique-Chavín Religious Complex than it is to understand the sociology of the rituals connected with them. We can hypothesize, generically, that ritual practices carried out in the ceremonial centers served to integrate a community, but that they also provided the forum when inequalities and leadership were created, negotiated, and manifested contested during the Middle and Late Formative Periods (Chicoine 2011; Dillehay 2004; Ikehara and Shibata 2008). The adoption of the Cupisnique-Chavín Religious Complex and its network of elite solidarity would have provided local leaders an opportunity to control these rituals and their meaning, to participate differentially in its associated network of prestige goods exchange, and to accumulate wealth in the guise of religious sanctity (Burger 1992:226).

Ceramic stylistic variability among the sites, and the ubiquity of similar ceramic styles among distant centers, and exotics such as obsidian, cinnabar, *Spondyllus* and *Strombus* shells, and anthracite, point to the intensification during the Late Formative Period, of a long distance exchange network that had emerged at the end of the Middle Formative (Burger 2008; Burger and Matos 2002; Contreras 2011). Archaeological data shows an increased consumption of exotics, such as obsidian, and costly resources, such as maize, during this period (Burger 1992; Ikehara, et al. 2013; G. R. Miller and Burger 1995; Seki and Yoneda 2005; Shibata 2010; Uzawa 2010). The intensification of use of camelids, either as a prestige food or as a mean of transport (G. R. Miller and Burger 1995; Seki and Yoneda 2005), may have been a related phenomenon (Burger 1992).

This intensification in exchange could be a reflection of increasing demands of prestige goods and exotics for rituals (Burger 1992:203; Ikehara and Shibata 2008). Through time, this intensification may have inflated the cost of performing rituals, and marginalized potential competitors. Consequently, the

management and control over ceremonies - organizational power- may have been restricted to a few households, paving the way for the institutionalization of social inequalities (Clark and Blake 1994).

The richest Formative Period burials date to this epoch. At Chongoyape, rich tombs, including that of a female, with gold ornaments, fine ceramics and other objects were discovered and looted in the early twentieth century (Lothrop 1941). During the 1990s, funerary contexts with male individuals buried with jewelry made from exotic rocks and gold, were discovered during research at Kuntur Wasi (Onuki 1997). Analysis of diet revealed patterns of consumption similar to that of elites in other parts of the world (Matsumura, et al. 1997). More recently, another rich burial was found in Pacopampa during the phase corresponding to this period, and the skull of the female individual exhibited cranial deformation, possibly as a mark of status (Nagaoka, et al. 2012; Seki 2010). In the three individual cases mentioned above, in each the gold ornaments and other objects were decorated with images of the Cupisnique-Chavín tradition.

In the Nepeña lower valley, the two major centers, Cerro Blanco de Nepeña and Huaca Partida were remodeled with a megalithic style of architecture during the Nepeña phase, and evidence for intensified exchange with highland populations is indicated (Ikehara 2010a; Ikehara and Shibata 2008; Shibata 2010). Shibata (2010) suggests that the survival of the Nepeña centers after the Coastal Crisis was made possible by the shifting of exchange ties from the North Coast communities to highland centers. It is very likely that the other settlements such as Huaca Herederos Chica in Moche Valley (Chauchat, et al. 2006), Pallka in the Casma valley (Chávez 2011) and Ancón north of the Chillón valley (Rosas 2007) displayed parallel adaptive strategies during this critical transition. In the specific case of Pallka, this settlement became an important node of the Late Formative Period lowland – highland network (Chávez 2011; S. Pozorski and Pozorski 1987). Its artifacts are similar to those recorded in the Nepeña valley, the adjacent highlands of the Callejón de Huaylas, and Chavín de Huántar in the Callejón de Conchucos region.

2.2.3 The Final Formative Period: 500-200 B.C.

Around 500 B.C., the Cupisnique-Chavín Religious Complex disintegrated in both the coast and the highlands. Its images and symbols disappeared from the iconographic repertoire of artistic expression in the Final Formative Period. Even in communities like Kuntur Wasi, where some individuals were still receiving special funerary treatment, their associated regalia lacked any of the iconography related to the old tradition (Onuki 1997).

The last ceremonial centers were either abandoned; replaced by new ritual spaces of different characteristics, or were re-occupied by settlements of different function (Burger 1992:228). In the Upper Jequetepeque, Kuntur Wasi was still undergoing major remodeling during the Copa phase, consisting of a building of a new set of mounds and plazas with a novel layout replacing the older one (Inokuchi 2010). In highland Ancash, villages and hamlets of the Huarás culture were relocated in old, abandoned Late Formative ceremonial centers. The ritual spaces of Chavín de Huántar were abandoned and the stonework was reutilized to build domestic structures of smaller dimensions (Rick, et al. 2011). In addition, new settlements were located in the slopes and hilltops, advantageous positions for defense against raids (Ponte 2001).

Current research (Arkush and Tung 2013; Billman 1999; Brennan 1982; Brown-Vega 2009; Burger 1992; Chamussy 2009; Chicoine 2011; Daggett 1987; Elera 1997; Ghezzi 2006; Ghezzi and Ruggles 2008; Ikehara and Chicoine 2011; Mujica 1975; S. Pozorski and Pozorski 1987; Wilson 1988) on this period generally has shown: (a) a reduction of the scale of the monumental architecture and the associated ritual spaces; (b) shifts in settlement patterns and the favoring of defensive locations; (c) construction of fortifications and other defensive features; (d) an increase of physical evidence of violence in human remains; (e) depictions of violence in iconography; (f) replacement of long distance exchange prestige good networks with more local and limited exchange networks; (g) the adoption of new types of ceramic vessels; (h) political balkanization; and (i) the emergence of new regional corporate styles (Salinar, Puerto Moorin, Patatzca, Huarás among others). In sum, the broad picture is one of deep change in how communities were internally organized, how they interacted with one another, and in their articulation with larger exchange and ideological systems. The nature of these changes has obvious bearing on how leadership would have been constructed in the North and North-Central Coast and Highlands.

As in all cases of societal transformation, we can distinguish significant local variability in the nature of these changes and how they were manifested along the North Coast (Ikehara and Chicoine 2011). While the widespread, regional similarities in political expressions and rapid shifts during the Late Formative can be related to the adoption of an overarching Cupisnique-Chavín Religious tradition, the high degree of regional and local variability in the subsequent period may be related to the loss of integration or connectedness between regions, and inside regions, between groups inherent in the shared Cupisnique-Chavín Religious tradition. As a result, local populations began to take off into different, historically contingent, trajectories. In the Virú Valley, the Final Formative Period was manifested in a drastic reduction, simplification, and dispersion of the population (Willey 1953). In other regions such as Moche (Billman 1996), Santa (Wilson 1988) and Nepeña valleys, population grew during

this period. In the Moche and Santa valleys, mound building declined dramatically or stopped (Billman 1999; Wilson 1988), but in areas such as Jequetepeque, Nepeña and Casma, new patterns of monumental architecture emerged and replaced the former ones (Chicoine 2010b; Daggett 1984; Ikehara 2010a; S. Pozorski and Pozorski 1987; Warner 2010).

Several hypotheses have been proposed to explain such drastic change. Burger (1992:229) argues that Late Formative communities relied on ideological foundations of power relations because they lacked the organizational features and coercive power to maintain long-term institutional stability. The drastic changes observed during the Final Formative Period, especially on the Coast of Ancash, may be the result of the failure of the reproduction of his proposed “non-coercive ideology of Chavín”. For the Salinar phase in the Moche valley, Billman (1999, 2002) describe the building of new modes of political power with less emphasis on the management of communal labor around monumental architecture, but organized to expand the agricultural frontier and to perform defensive tasks in a context of escalated conflict.

The drastic changes witnessed in the Casma Valley during this period, including the abandonment of the previous centers and the nucleation of population in semi urban settlements such as San Diego and Pampa Rosario, were explained by Pozorski and Pozorski (1987) as the result of invasions by the adjacent highlands populations. However, even if this explanation is plausible, it cannot explain the apparent abandonment of sites in other valleys where this novel urban residential pattern has not been recorded.

In the Nepeña lower valley, patterns of population aggregation were similar to those described for Casma valley, and seems to be part of a three-tier hierarchical settlement system (Chicoine and Ikehara 2010; Ikehara and Chicoine 2011). These new settlements seem to have been founded during the last part of the Late Formative Period, based on similarities with the ceramic assemblages from Cerro Blanco de Nepeña and Huaca Partida (Nepeña phase); and radiocarbon dates from excavated contexts¹ (Shibata 2014). Despite the potential contemporaneity between those settlements, in Caylán and other similar sites such as Huambacho and the Casma sites, no imagery from the Cupisnique-Chavín Religious Complex has been found in ceramics, architecture or any other support, and moreover the art style that is present contrasts sharply with it (Chicoine and Ikehara 2010; Helmer, et al. 2012; Ortiz Zevallos 2012). This can be interpreted as the rise of an alternative political ideology and the active negation of the symbols and meanings related to the Cupisnique-Chavín Religious Complex (Ikehara and Chicoine 2011). However, the hypothesis of highland invasion is not supported by the Nepeña Lower Valley archaeological

¹ David Chicoine, e-mail message to author, January 30, 2014

record. Research in Huambacho and Caylán demonstrate the use of typically coastal conical adobes (but in different ways), the continuity of ceramic assemblages, a high reliance on marine resources, and shows that the communities of middle and lower sections of the Nepeña valley had different architectural canons (Chicoine and Ikehara 2010; Daggett 1984; Ikehara 2010a; Ikehara and Chicoine 2011).

2.2.4 The Epi-Formative and the Early Intermediate Period: 200 B.C.-500 A.D.

After a few centuries of political fragmentation, some North Coast communities witnessed higher degrees of political integration. In the Moche, Virú and Santa Valleys, archaeological research has shown the rise of large scale political entities which implemented extensive agricultural infrastructure, and built massive mounds through the management of large labor pools extracted from populations organized in hierarchical settlement systems during the respective Gallinazo or Suchimancillo phases (Billman 1996; Millaire 2010; Wilson 1988).

It has been proposed that the Gallinazo culture was the physical materialization of an expanding state, and because during this epoch the Virú Valley concentrated the largest population in the North Coast, this area has been considered the origin of such expansion or at least of such influence (Fogel 1993; Spencer 2010). The Virú Valley population reached its maximum during this epoch and it was organized in a four-tier settlement pattern (Millaire 2010; Willey 1953). The demographic scale of its capital, the Gallinazo Group (between 10 000 to 14 000 people) paralleled Monte Albán during its process of state formation (Millaire 2010; Millaire and Eastaugh 2011; Willey 1953). The hypothesized demographic growth may have been supported by the expansion of the agriculture in the lower section of the valley as well as the incorporation of population of the middle section of the valley into the system (Millaire 2010).

In the Moche Valley, the Gallinazo Phase has been seen as representing a disruption in the settlement pattern, with a rearrangement of the lower valley population in a three-tier settlement system with Cerro Oreja as the head. Increased aggregation, the formation of large buffer zones, and the construction of formal defensive structures have been explained as the escalation of conflict with highland populations from the upper section of the valley moving to the middle valley (Billman 1996, 1999).

The Santa Valley, during the Early and Late Suchimancillo Periods, shows an increase of population (around 20 000-30 000 people) focused on the upvalley sections in a context of agricultural expansion and warfare (Wilson 1988). Population settled in large clusters dominated by ceremonial

centers with elite residences. Wilson considers the existence of strong ties with highland (Recuay) populations and northern valleys, while conflict arose with southern communities (Nepeña or Casma Valleys).

More recent approaches consider Gallinazo as the ethnic and demographic background in which Moche, as a political ideology (Bawden 1995), developed and was adopted at different paces and ways along the North Coast (Millaire and Morlion 2009). These approaches treat Gallinazo not as a political phenomenon (Fogel 1993) but as the shared material culture of many communities of the North Coast, with different degrees of political integration but tied by common cultural traditions.

Between the third and fourth century, the lower section of the Moche Valley was politically consolidated. Initially, the political center was located in Cerro Oreja, but afterwards, it was established in the Huaca del Sol/de la Luna settlement from where an archaic regional state was managed during several centuries (Billman 1996, 1999). The initial influence of Moche state in the Santa Valley consisted in the settling of migrants in a sector of El Castillo, a local political center where elites and non-elites were using Gallinazo assemblages in their daily life and in politics (Chapdelaine, et al. 2009). According to Chapdelaine there is no evidence of a violent intrusion into the Valley and he suggests a context of pacific coexistence between local Gallinazo communities and Moche colonists. Only later on, around A.D. 500, Moche politics became dominant in the region, mobilizing Gallinazo population upvalley, and establishing a new administrative center in Guadalupito (also known as Pampa de los Incas) at which Moche IV ceramics are ubiquitous.

For the Nepeña Valley, there is no recording of any Gallinazo phase in the previous surveys (Proulx 1968, 1973, 1985). However, some formal characteristics of the mounds of Tres Marías (PV31-71/73), in the lower section, resemble Gallinazo mounds in other valleys². They were built with adobe bricks with cane marks, no Moche ceramics were recorded, but some Recuay fineware was found by Proulx (1985:104-106). If such case, communities in the lower section during this period may have similar cultural and political patterns with their similar in Santa and Virú valleys. Moreover, it fills the gap between the Final Formative occupation centered in Caylán and the Moche occupation around Pañamarca, between which Tres Marías mounds are located.

The Moche political center of Pañamarca and its influence in the local populations is very likely to have begun around A.D. 500-600. The characteristics of its mural art and the architectural details resemble the Templo Nuevo of the Huaca de la Luna complex in the Moche Valley, which have been

² David Chicoine, e-mail message to author, January 30, 2014

dated to the Moche IV (Trever, et al. 2013; Uceda 2010). It has been hypothesized that Moche presence is stronger in the lower section of the Valley, while in the middle and upper section, communities were engaged in frequent interaction with highland Recuay populations (Proulx 1982). The present research confirmed the presence of Moche ceramics in the Middle Valley, but Moche plain wares and non-figurative decoration techniques are sometimes indistinguishable with those of Middle Horizon Huari Norteño styles; a situation that can be explained by the hypothesis that pottery of both styles was manufactured by the same groups.

In the highlands of Ancash, around the third century A.D., the Recuay style fineware began to be employed as a prestige good among the communities related to the Huarás material culture (Lau 2002b). Dominant in the Callejón de Huaylas and Callejón de Conchucos, this distinctive kaolin-based ware has also been recorded in the coastal valleys (Bennett 1950; Lau 2011; Proulx 1982; Wilson 1988). Some authors consider the presence of such ceramics as reflecting highlanders moving to coastal valleys or coastal people identifying themselves as such (Proulx 1982). An alternative hypothesis is that during this period, these wares became a prestige item and was widely exchanged between highland and coastal populations.

Recuay settlements in the highlands were placed in specially defensive locations and were organized around large central settlements (Lau 2010a, 2010d). While large portions of the coastal valleys were politically consolidated, the political fragmentation that characterized Huarás period persisted during Recuay times. Allen (2008) has argued, in his New Zealand research, that a fortified settlement pattern is an impediment for regional political consolidation, because it makes difficult to defeat neighbors, perpetuating the political fragmentation and competition between communities.

Warfare, in addition to be frequent, also provides means for status acquisition in an regional context of intense factional competition (Lau 2010a). Settlements became fortified and spaces for public ceremonies were associated to elites and ancestor veneration providing additional means for the consolidation of leadership among highlands communities (Lau 2002a, 2006, 2010a).

Proulx (1982, 1985) recorded Recuay pottery in the Nepeña Valley, especially in the Moro Pocket, and he argues in favor of a pacific coexistence between both populations (in contrast with the situation between Gallinazo people and highlanders in the Moche Valley). However, the dating of Recuay pottery in the highlands Ancash, and Moche pottery in the Santa and lower Nepeña Valleys, suggests an earlier presence of Recuay fineware associated to a possible post-Salinar and pre-Moche occupation (a local form of Gallinazo culture?), and this may be more relevant for the middle and upper sections of the valley where, according to Proulx, Moche presence was not dominant. Finally, because the expansion of Moche

influence dates around A.D. 500, this may correspond to the moment in which the local trajectory of social change ends and the Moro pocket became part of a larger sociopolitical entity.

2.3 SUMMARY

The North Coast of Peru offers excellent cases for studying processes of political change in Andean prehistory. The local trajectories in the region have shown two moments of potential crisis, only one of them visible in the Nepeña Valley. The first episode is linked in part to the disintegration of the coastal network of the Cupisnique-Chavín Religious Complex around 750 B.C. However, not all the communities suffered radical political transformations; in many of them, especially in the highlands, this ideology was maintained and even become more popular.

The second episode of political crisis, around 500 B.C., was linked to the final decline of the religious complex, and was followed by a transformation of political structures. A general review of previous investigations suggests a great variability of responses between valleys, but also potential intra-valley variability as well.

In contrast with other coastal valleys, the communities in the Nepeña Valley were not dramatically affected by the crisis of 750 B.C., but after 500 B.C. dramatic sociopolitical transformations in the communities are visible in the archaeological record.

Community reorganization and leadership building after crisis was a main concern of my research. Why did people abandon traditional political practices that were successful over centuries in the North Coast? Subsequently, there was innovation in many aspects of life: politics, exchange, ceramic production, foodways, etc. Comparing Final Formative (500-150 B.C.) pottery styles to those of the Cupisnique-Chavín Religious Complex has made some scholars consider the Final Formative Period one of cultural backwardness, or societal decline, in the evolutionary trajectory of the North Coast.

The available evidence is equivocal for this period. While bioarchaeological evidence has hinted at increased degrees of nutritional stress and violence among some Final Formative populations, studies on settlement pattern studies suggest a more complex and varied picture. For instance, while the Viru Valley population was living in dispersed hamlets during this epoch, the Nepeña Lower Valley communities were organized in complex polities, implementing the largest investment in public architecture seen since the initial settling of the valley.

The defensive location of the new settlements indicates that conflict spread, and began to be part of daily life. Warfare leadership, as visible in the later Moche and Recuay iconography, may have started to be relevant during this period.

The sometimes conflicting or non-congruent interpretations offered by prehistorians for this period may not be examples of better or worse scholarship, but instead but they may be showing the diversity of social trajectories on the North Coast. The broad picture suggests that this period was a time of cultural diversity and high degrees of economic and political experimentation. And one can suggest that the more or less stable socioeconomic and political forms visible during the Early Intermediate Period, may have had their origins in the Final Formative innovations.

The advances in the understanding of the Final Formative transformation require the investigation of the internal processes driving these changes, a more detailed picture of the internal dynamics of the local and supra-local communities, better agent-based understandings, and examination of long-term political developments. The selected area, the Middle Nepeña Valley – the Moro Pocket- is an excellent case to investigate such issues.

3.0 METHODOLOGY

This research investigated social leadership within communities through time. Doing so required methods and analytical tools generating a multiscalar perspective on social, economic and political processes within and among supra-local communities, significant portions of which may have consisted of low density occupation. Because of this, my approach differed from more conventional pedestrian surveys in several ways. Most significantly, my methodology used: a) refuse distribution and density as a proxy for population, based on the assumption that all the households, despite their social rank, will generate and discard artifacts according to the size of the social unit and the length of the occupation; b) sampling methods and units of collection/analysis that permitted analysis of demographic patterns invisible in traditional site-oriented survey; and c) a proxemics approach to monumental architecture.

The coast of Ancash region has been the focus of intensive archaeological research. While the neighboring Santa and Casma valleys were surveyed by David Wilson (1988, 1995), the Nepeña valley was been the focus of two regional surveys (Figure 3-1). Proulx (1968, 1985) surveyed the whole valley, looking for sites from which artifact collections were made to reconstruct the local cultural sequence. Daggett (1984)'s research was focused on the Early Horizon Period (Late and Final Formative) occupations, and provides many important insights about political dynamics occurring during this time, such as the identification of high density occupation and the potential existence of conflict in the Moro Pocket. However, the data from these surveys in Nepeña were insufficient for the goals of my research investigation. Different methodology and analytical tools, successfully employed to answer similar questions in other regions of the world, were introduced with this research for the first time in the North Coast of Peru.

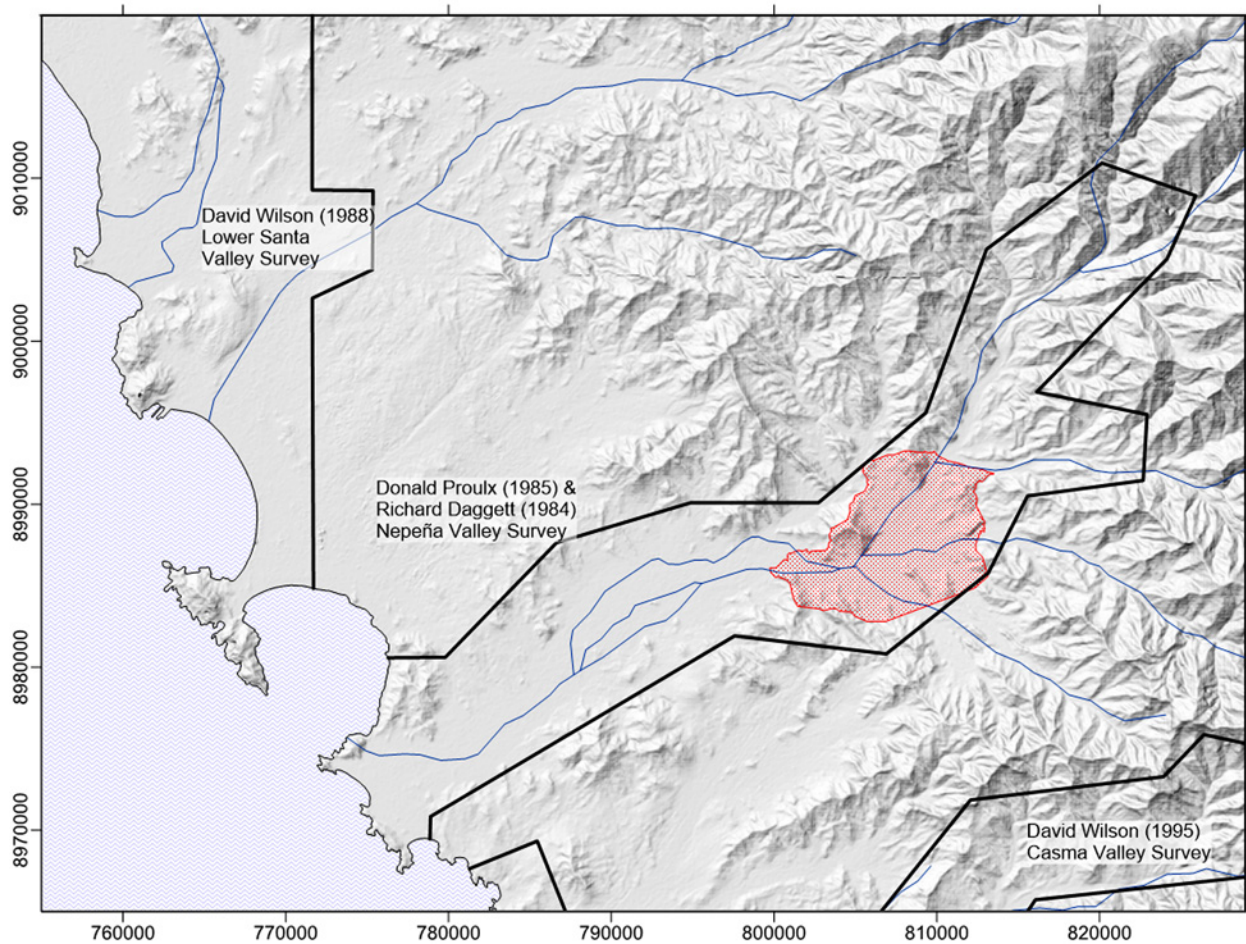


Figure 3-1 Map of the Nepeña Valley comparing the survey area of this investigation with the approximate location of the Proulx (1985) and Daggett (1984) surveys.

3.1 REGIONAL SURVEY IN THE MIDDLE NEPEÑA VALLEY

3.1.1 Survey Area, Limits and Scale

The sociopolitical trajectory of the Middle Nepeña Valley or Moro Pocket, was chosen as the study case because the area is topographically bounded, a dense formative occupation has been described by previous research, and major ceremonial centers were still in use during the Final Formative Period.

The perimeter of the survey enclosed 87.8 km², from which 83.7 km² of land -including valley bottoms, riverine zones, dry ravines, mountains, flat alluvial terraces, and slopes- were systematically

surveyed. The remained 4.1 km² of the Moro Pocket were left out because they correspond to urban areas such as Captuy, San Juan and Motocachy towns in the Nepeña district, and Moro, Virahuanca, Vinchamarca and Paredones towns in the Moro district; water reservoirs and oxidation ponds; garden plots or mines in which owner's permission was no granted; and inaccessible areas in the slopes of the hills.

The perimeter was defined using the topographical features that define the basin (Figure 3-2). The mountain crests were usually the limits of the survey unless they were occupied. If so, as occurred in the northwest and southeast border, 100-200 meters of the opposite slope was surveyed. In the dry flat alluvial fans and the mountain ranges as far as 2.5 km from the cultivated areas were surveyed. The west limit was placed including the hills in which Kiske and Maquina Vieja sites are located, after this point the valley widens and the Lower Valley begins. The northeast limit was defined by the border of the cultivated area in Salitre River, and an arbitrary line connecting this area with the small pocket of cultivable land North to Captuy town. The eastern limit was defined by the El Arenal sector of the road connecting Moro and Pamparomás towns, and the dirt road connecting this sector with Pocós. It is important to warn that these east limits were arbitrary and do not correspond to a decline in occupational density. Indeed, continue occupation have been reported up to Jimbe in the northern branch of the Nepeña River system (Daggett 1984).

The region inside the survey area ranges between 270 masl in the bottom of the valley in the east border, and around 1080 masl in the mountain adjacent to San Juan town. This area includes the Premontane Desert and the Premontane Desert Scrub life zones with the respective local ecological variability as has been previously described in Chapter 2.0 . The scale of the survey was defined to encompass most of the Moro Pocket, and simultaneously, to remain feasible to be covered under the limited budget and with current survey methods and data collection techniques. Similar surveys of sedentary agricultural populations in other regions has range between 40 and 150 km² (Cuellar 2009; Haller 2004; Liendo Stuardo 1999; Martin 2009; Sullivan 2009)^{3,4} and were able to record the boundaries of one or more supralocal communities or polities.

³Adam Berrey, personal communication, February 20, 2014

⁴ Pedro Argüello, personal communication, February 20, 2014

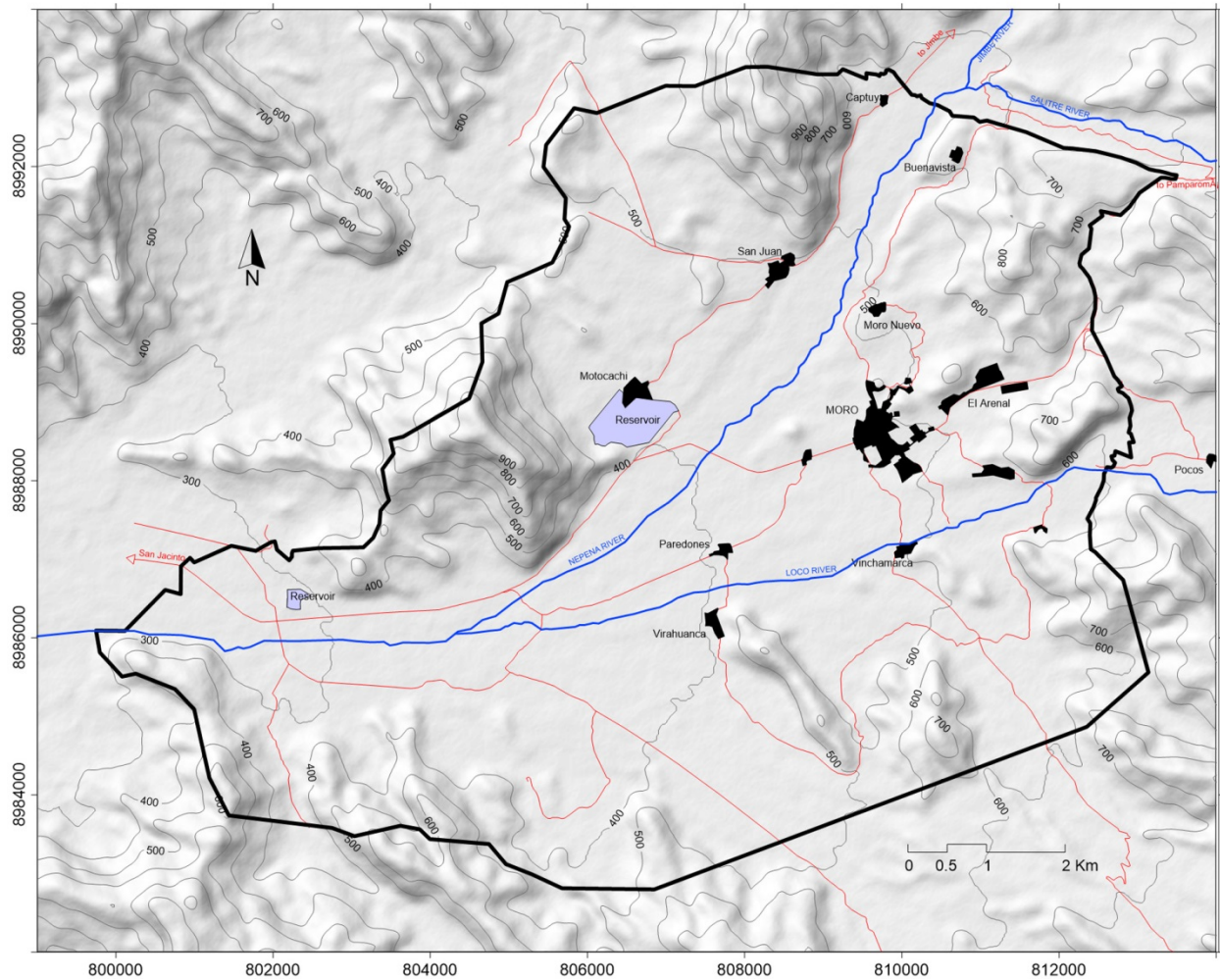


Figure 3-2 Map of the Moro Pocket and the limits of the survey in relation to modern features.

3.1.2 Regional Survey in the Middle Nepeña Valley

The Nepeña Valley Prehispanic Settlement Survey (*Prospección de Asentamientos Prehispánicos del Valle de Nepeña -PAVN*) consisted in a full coverage pedestrian survey, which methods and approach were based in previous regional surveys, current methodological discussions and recent archaeological research. The survey carried out by Sanders, Parsons and Santley (1979) in the Basin of Mexico introduces field techniques and analytical tools that have been adapted by posterior research (Blanton, et al. 1982; Drennan 2006; Kowalewski, et al. 1989). Later refinements developed in surveys in Colombia and China (Chifeng International Collaborative Archaeological Research Project 2011; Drennan 2006; Drennan and Peterson 2008; Peterson and Drennan 2005) has been included to allow the reconstruction of the

demographic patterns, and quantitative multiscalar analysis of the political and socioeconomic organization of the region.

Despite the practical advantages of spatial sampling (Plog 1990), it was avoided because the reconstruction of the settlement system requires the recording of most of the occupational evidence. Sampling provides data to assess problems such as demographic scale, general distributional patterns, etc., but it gives a fragmented spatial picture that does not permit the fully reconstruction of the patterns of social interaction, such as hierarchical organization, the detection of uninhabited zones, or the manipulation of the scale in the subsequent analyses (Kowalewski 1990)

In contrast with other surveys in the Andean region (i.e. Billman 1996; Helaine Silverman 2002; Wilson 1988), the present research is not based in the identification and delimitation of archaeological sites. Archaeological sites have been defined as spatial discrete units defined by the clustering of high densities of artifacts and/or standing architecture and despite its popularity as analytical units, shortcomings of this approach have been noticed (Banning 2002; Drennan, et al. 2003; Dunnell 1992; Dunnell and Dancey 1983). First, the definition of boundaries of the sites is problematic when artifacts densities are considered and weighted in the field (Gallant 1986). This is particularly critical when posterior analysis is based in the frequency and size of settlements (i.e. rank-size analysis, spatial clustering, etc.). Second, preservation bias has been particularly central in critiques of validity of surface data, affecting in particular those surveys based in standing architecture. Moreover, cultural factors, such as temporality of occupation or household's status and wealth influence the material investment in architecture (McGuire and Schiffer 1983), conferring differential preservation potential to buildings. Third, when sites are defined and compared, what is in between them is usually neglected or considered as unoccupied zones (Dunnell and Dancey 1983). In the hypothetical case in which the major part of the population is rural, dispersed and living in simple dwellings, they will be missed from the reconstruction of the settlement system.

Archaeologists correlate the spatial distribution of artifacts to economic, social and political variables (Dunnell and Dancey 1983). Defining archaeological sites restrict the loci of such behavior to bounded places, when in real life people tend to use most part of their surrounding landscape but at different intensity, frequency and pace. Any method of field data collection trying to catch the set of interactions that govern community organization must consider such variability and not focus only in those places resulted from frequent and intense interaction such as urban areas, or resulted from large scale activities such as monumental architecture. This implies a shift in the survey goals from the discovery of sites to the discovery of artifacts (Dunnell and Dancey 1983:272).

Archaeological fieldwork goals and methods need to be contextualized in a continuum of spatial scales inversely proportional with data resolution. On the one hand there are methods of data collection of small scales but high resolution –such as excavation-, and in the other, there are methods of large spatial scales but relying in low resolution –such as regional surveys-. Methods of large spatial cover with high resolution of data become unpractical, while small scale research with low resolution can be useless for some research goals. Excavation strategy is an unpractical way to deal with the problem of representativeness of the data for the present research, especially because it is not site-oriented. A focus in excavated sites makes regional comparison a costly task because it will require the archaeological intervention of many sites (Dunnell and Dancey 1983). Even if this is possible, with the prioritization of the recording of primary contexts it will be difficult to discriminate whether differences between analytical units were the result of differential behavioral patterns of a group or the result of an isolate event in their respective history. Randomly shuffled collections by cultural and/or natural events constitute less problematic samples to describe the overall patterns of human activity in a loci during a specific temporal window. For instance, in the analysis of the role of craft production in the economic organization of communities, it may be more important if this task was carried out with at least moderate frequency and/or intensity during several generations than if it was carry out once in a household lifecycle. The contrast between these two situations will be noticed by the density of remains left by such activity.

Consequently surface survey, as relying in low-resolution but large-scale methods of data collection, constitute a good strategy to explore patterns of differentiation. However, concerns on the reliability of surface assemblages exists (Banning 2002), being the most important ones: a) how well surface data reflects subsurface remains; b) the effects of the post-depositional processes in the displacement of artifacts; c) the differential preservation of remains; and d) the effect of visibility and obtrusiveness on the chances of artifact discovery.

As a response to such concerns Dunnell and Dancey (1983:270) stated that survey with surface artifact collection program is an appropriate technique independent of the conditions of subsurface remains. Assumptions about the validity and usefulness of survey data are erroneous not because surface collections are infallible but because excavation per se is not an insurance against bias. Surface artifacts distribution and frequency, despite its affectation by depositional and post-depositional factors (Schiffer 1987), are still the physical remains of the activities carried out in a location. It can be argued, indeed, that *because* such artifacts are constantly removed, they constitute acceptable data to reconstruct past behaviors. Agricultural activity, usually accused to be a major disturbing agent of archaeological context,

can create optimal conditions for surface artifacts surveys: the continuous removal of subsurface layers may bring into light ancient occupation, and if practiced during centuries, it may have been deposited in the modern surfaces random samples of what have been place below.

Horizontal displacement of artifacts by human activity may have been limited (Roper 1976). Field observation of garbage dispersal in modern Colombian rural households shows that rarely the major part of discarded artifacts ends outside 50 m radius despite several generations of occupancy (Drennan and Boada 2006). Similar results can be described for the local conditions in the Nepeña Valley (Appendix A). Moreover, it is particularly clear that without the use of modern urban large-scale garbage management, most of the rural garbage movement stays inside the limits of the agricultural fields. While in dense settlements people can throw garbage in a neighboring abandoned house, in rural landscapes rarely people do the same in the neighbor fields, abandoned or not, and very likely because the distance between fields may play an important role in such behavior. Consequently, I am confident in saying that surface artifacts are the remains of activities carried out in a nearby location.

There are situations in which artifact displacement can be suspected as for instance in settlements located in slopes and hilltops, which are exposed to the downward displacement of artifacts, or in those sectors under mechanized agriculture and very large cultivation fields, such as in the case of sugar cane agriculture. Even if some displacement can be noticed, it may not affect the demographic estimates of the area, just the location and dispersion of the proxy data. Considering the scale of the region -87.8 million of m²-, distances of few dozens of meters can be considered as negligible.

The preservation of remains may also depends on weather conditions and human activity. The dry conditions of the North Coast allows only a negligible alluvial deposition and erosion in the slopes and hills. In many prehistoric settlements of the Middle Valley the natural bedrock was clearly visible while surveying. The only critical factor that may obscure past occupations is a posterior human settlement. In such situations, it is expected to have better representations and proportions of the later periods while early ones are missed. However, the results of this survey shows that the second period share a major proportion of the whole sample, indicating that either the sample has been negligible affected by later reoccupation and/or that early times had a dramatically larger population. In contrast, the alluvial zone is continually exposed to inundation from the river, especially during ENSO years. Despite this, pre-Hispanic human occupation was found. The riverine zone was the only in which no remains has been found, but it is hard to imagine people settled there and exposing their homes to potential destruction every summer.

The differential preservation of cultural remains is one of the main bias in the archaeological record. In the most extreme hypothetical situation in which a whole site is wipe out, it is very likely that

no structure is left standing but artifacts will stay in the area. It may require a really conscious effort to erase every artifact evidence from a place. A site-based survey will have intrinsically a large bias because this factor, even if we “take into consideration the relatively much better preservation of structural remains that characterizes the coast of Peru” (Wilson 1988:59). In such statement it is implicit the assumption that good preservation equals to high degree of permanence of ancient structures in the landscape. In return, artifacts will be less affected by similar destructive events: someone can destroy the dwellings occupied during several generations by x number of households but to disappear the garbage left behind by them is a more difficult task.

Finally, the dry environment permits only minimum vegetation cover in most part of the region. Dense vegetation growth only near water sources or in cultivated areas. Even when agriculture is practiced, many crops as fruit-trees, young maize, sweet potato, manioc, etc. do not obscure the terrain surface. Only in some extreme situations such as compact wild cane grouping, grown sugar cane, grown maize, etc. observation was limited to the edges of the terrain where water canals usually run.

3.1.3 Survey Techniques and Methods of Surface Collection

The primary goal of the survey was the identification of any evidence of human occupation: architecture, garbage, and other landscape features such as canals, petroglyphs, etc. For such purpose a complete cover of the ground was attempted.

While previous surveys has relied in printed maps and/or aerial photos to design a systematic way to explore every corner of the regions under study (i.e. Sanders, et al. 1979; Wilson 1988), current technology makes available high resolution satellite imagery of large areas that can be used for both fieldwork and digitization of the data (Conolly and Lake 2006:66-77). These images were provided by GeoEye⁵ Foundation and include a panchromatic band with a resolution of 0.5 m per pixel (Figure 3-3). After a process of orthorectification using an ASTER GDEM⁶ database, these images were used to locate modern paths not recorded in maps, to place accurately the survey units, and to sketch architectural features.

These digital images were superimposed by a UTM grid in an AutoCAD file. Sections of the map were printed at 1:10000 scale in letter size paper which were taken to the field and used to record

⁵ Now DigitalGlobe (<http://www.digitalglobe.com/>)

⁶ Property of METI and NASA, accessible from: <http://gdem.ersdac.jspacesystems.or.jp/>

directly the location, shape and size of the survey units. After a day of fieldwork, the polygons of the survey units were digitized in the AutoCAD project. These procedure permitted to have an updated view of the progress of the survey, but also permitted to have a backup of the location of the units if the original paper copies were lost. In two opportunities printed maps were lost during the fieldwork, it was enough to print them again with the previously surveyed units to continue with the remaining areas.

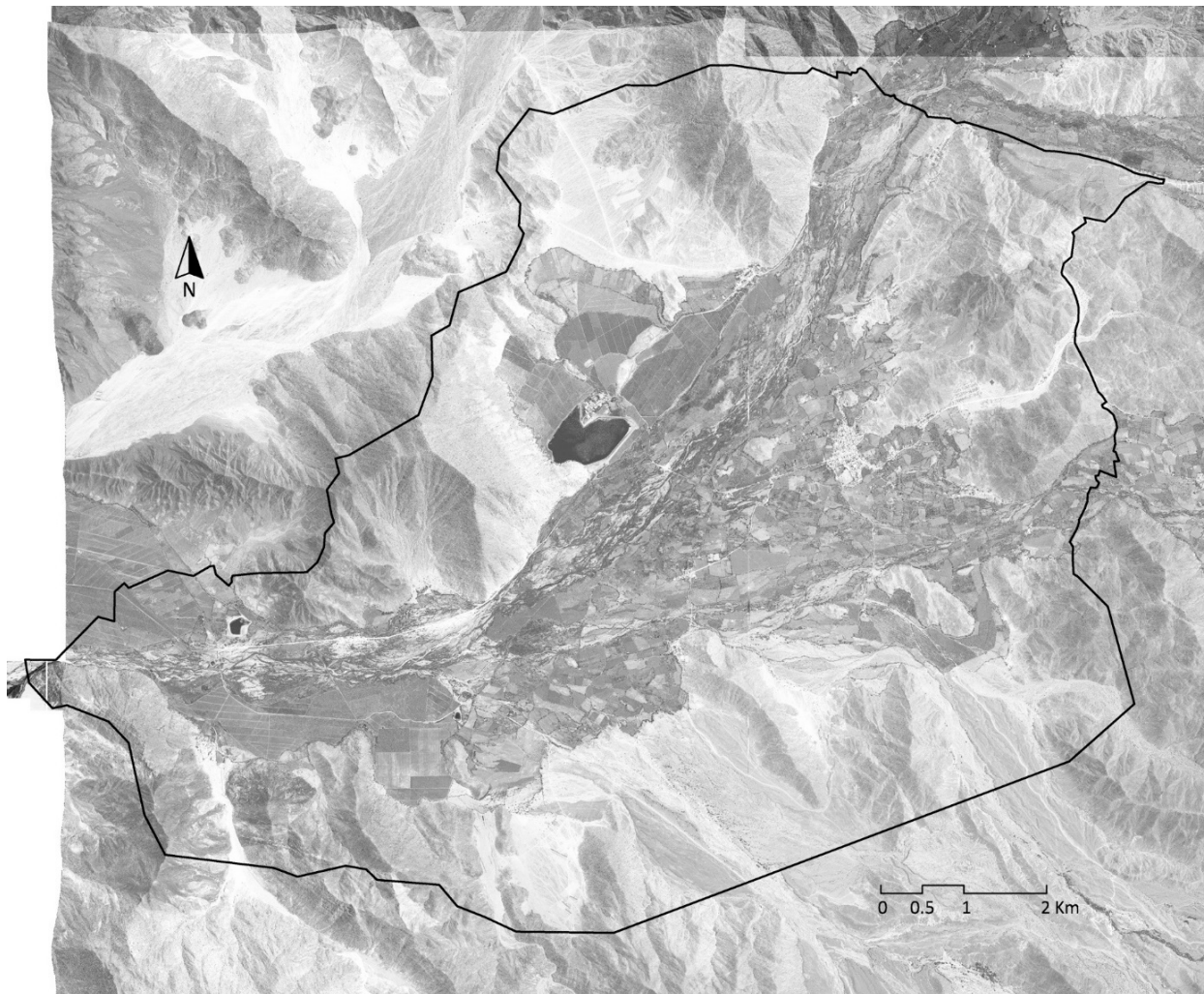


Figure 3-3 Survey boundaries overlaid over an orthorectified panchromatic Geoeye image layer.

The 83.7 km² of the survey was covered in 91 effective days of work (of 124 days in field) or 0.92 km² (920 ha) per day. The daily cover varied widely according to the conditions of the terrain, the characteristics of the modern land use, the characteristics of the archaeological record, and the conditions of the crew. The minimum daily cover was 0.1 km² (10 ha) while the maximum was 3 km² (300 ha). The speed of the work was substantially reduced when dense archaeological remains were present -

in the form of architecture, artifact density, or both-, the need to request permissions to enter in private lands, and when the available crew was not enough to form more than one survey team. In contrast, surveying with two or three teams, the existence of large unoccupied zones, and surprisingly the surveying of hills, permitted a faster fieldwork.

It was noticed that three members was the optimal size for one team according to the different tasks assigned: architecture sketching, artifact collection, form filling and spatial location recording with GPS. Finally, every crew members have different characteristics, and it was very helpful to have a team “specialized” in surveying hills and slopes which require large physical effort but with almost absolute freedom of movement, while the other was “specialized” in surveying agricultural fields, in which less effort was required but more frequent interaction with land owners was expected.

The discovery of artifacts was carried out systematically by the careful examination of the three different types of terrain. Hills and slopes were examined by two teams at the same time. One team climbed the hill and surveyed the ridges and the surrounding slopes, while the other surveyed the base and lower slopes of the hills. In this way much of the mountainous terrain was checked and only those inaccessible sectors were left out. The valley bottoms and the slightly hilly terrain is nowadays mainly occupied by agricultural fields and towns. A team of 2 or 3 people were enough to examine each field carefully. When no artifact were found, up to 5 extra minutes were used to check carefully in some specific spots such as water canals, holes, etc. and then move on to the next field. Very large agricultural fields were surveyed with transects with 25-30 m spacing. Finally, wide ravines and open dry areas such as alluvial fans –pampas- were surveyed by teams of 7-10 people in transects spaced by 40-50 m. In this case, every team member walked in zigzag of 20-30 meters wide so the real separation between any two members reduces to 20-30 m. This was an effective technique to cover large areas and at the same time allowing the record of artifacts scatters of only few meters wide. In all the cases, when architectural remains were encountered, one team member was responsible of the draft of the structures, while the others were sampling the surface in order to obtain a collection of artifacts.

When any member of the team detect artifacts in the surface, the rest of the team help to define the density and extension of the dispersion. From previous fieldwork I noticed a high density of sherds present in sites of this section of the valley (Ikehara 2010a). Consequently, in order to avoid background noise resulted from post-depositional factors, four sherds was set as the minimum to define the minimum collection size to define a survey unit. However, because the goal was to record human occupation, less than four was collected when other evidences such as architecture was present. When this initial condition was fulfilled, the extension of the dispersion was estimated. With the aim of keeping

a fine grain record of spatial variation an area of one hectare -10000 m²- was set as the maximum to delimitate a survey unit. In those places in which the cultural remains cover larger areas, the whole was subdivided in smaller units. Settlements of several hectares was recorded as multiple contiguous units, and consequently several artifacts collections were collected for them.

The survey units were defined using modern features –such as fences, walls, etc.-, topographical features –hilltops, ravines, etc.-, or prehistoric features –such as canals, architecture, or arbitrarily when substantial changes in the surface remains was noticed –such as drops in density, empty areas, etc.-. Once defined, a consecutive number was assigned to it, the unit coordinates was taken with a portable GPS unit, and it was drawn in the printed satellite imagery and.

For each survey unit, a collection was obtained. Every collection had a goal of 25 sherds which made it possible to estimate the proportions of types (by period, or by form) with error ranges of about 0.1 (10%) and a 66% confidence level. This was a realistic goal in practice. Some readers can argue that this sample can be “small” for large sites, however the way the survey units were delimited makes it possible to do several collections in large settlements. For instance, in a 10 ha “site”, ten collections must be made, which means at least 250 sherds taken from the different sectors, thus providing overall a quite good picture of the socioeconomic and political behavior of its inhabitants.

While sampling was discarded in defining the spatial extension of the survey, it was indeed used to get collections of artifacts inside each survey unit in order to avoid selection bias. Additionally, in contrast with the surveys carried out in the Basin of Mexico (Sanders, et al. 1979) or in the Moche Valley (Billman 1996), the temporal assessment of the collections was not carried out in the field but in the post-field laboratory analysis, speeding the process of survey but also avoiding the intensive search for “diagnostic” pottery such as decorated sherds or rim sections. Despite the high occurrence of surface material in the area, it varies greatly and two strategies of sampling were used for practical matters.

Sampling methods were adapted from those used in the regional survey of the Chifeng region in Northeast China Drennan, Teng, et al. (2003) and Parita Valley in Panama (Haller 2008). Systematic collections were obtained from areas with a high density of artifacts. In Chifeng, 3 m diameter circles were drawn in the ground and all the artifacts inside were collected. If the minimum number of sherds were not reached, many circles as required were made until the goal was reached or surpassed. This sampling method permits the record of the density and the collection of artifacts even in low density areas. However, the wide variation and high sherds densities detected in preliminary visits to the region suggested that the 3 meter circles could slow dramatically the daily work. For instance, if sherds densities were around 10 sherds/m² a collection in the circle will consist in around 70 sherds, but if densities were

higher than 100, collections will consist in bags with more than 1000 sherds, some of them of such good preservation that cannot fit in one's hand. This set a limit of how long a team can work daily in dense settlements, but also increase the number of unnecessary data to be analyzed in the lab stage, considering that only 25 was required. This survey adapt these techniques to the local conditions of Peruvian Coast by relaxing the area of the unit from where the collections were taken. In places with very high densities, sampling areas as small as 0.5 m² squares were used, while when lower densities were involved, sampling areas as large as 25 m² were used. Many times, more than one squares were required. These squares or rectangles were quickly drawn using the meter scale for photographic recording.

Because variability in artifacts distribution are also replicated in smaller scales, there is the concern that some bias can be introduced during sampling because it is highly dependent of the specific spot from where it was taken (Drennan, Teng, et al. 2003:137). For instance, if a team was particularly attracted to an especially dense cluster of artifacts, the data will increase substantially the estimated frequency of artifacts, and consequently the population estimates, for this location. This problem was assessed systematically, but subjectively, identifying spots of higher and lower than average density and taking a sample in the middle of both. Usually this method selected sectors that if any direct extrapolation need to be made for the rest of the survey unit, we can be satisfied with the choice.

There are situations in which densities are very low. In such cases, trying to get systematic collection can be extremely slow, and an alternative method must be taken. In the Chifeng survey, the similar problem was addressed collecting with general collections (Drennan, Teng, et al. 2003). A general collection was carried out to reach the goal of number of sherds with the minimum bias and without sacrificing much time. If the minimum number of sherds -4- was reached, but densities were lower than 1 sherd/m², instead of defining circular or rectangular sampling units, the team collected the first artifacts they encounter until the minimum of 25 was obtained. There were situations, in which artifacts were so scarce that either even this minimum cannot be reached or the task involved take too much time. In such cases no more than 5-7 minutes were devoted to collect as many as possible even if 25 cannot be gathered.

3.1.4 Architectural Remains and Other Landscape Features

Data on architecture is used in this dissertation as a material expression of ritual practices –in the case of plazas and platforms-, political organization –ubiquity and variability of monumental architecture-, and as

proxy to approximate to absolute population estimates –in the case of dwellings and other residential architecture-.

Architectural data collection was designed to gather basic information while avoiding the excessive slowing down the survey pace. Consequently, no more than 30 minutes was given to most of the constructions, while no more than an hour was used in the few cases when massive and/or extensive settlements were found. This was carried out while other members of the team were recording survey units and taking artifacts collections. Normally, when it was pretty clear that a useful drawing was not possible in such time, only the main sections, especially plazas, or platforms were delineated while smaller structures such as dwellings and small platforms was only indicated but not sketched.

The structures were recorded by the use of satellite imagery, field measurements, field annotations, and the use of portable standard GPS units. The high resolution of the satellite imagery permit the identification of structures and can be used as a base for the general layout of the settlements. However, while buildings can be identifiable and characterized, structures or details, smaller to 0.5 meters, are not discernable. This limitation can be surpassed by field reconnaissance in which measurements and notes were taken. Despite the range of error of the portable standard GPS units, from 3 to 10 m depending of the topographic conditions and satellites' availability, they were very useful *in combination* with the other methods of architectural data collection.

Complementary information was quickly gathered by the use of digital photographs with their respective scale reference. The approximate height of platforms and mounds were obtained in field or from photos by placing several team member at different location and elevations to compensate perspective. Orthogonal horizontal photographs of walls and masonry were taken to compare building techniques. While not all this information is used in the present dissertation, it will be used in future continuation of the present research.

There are some settlements in which domestic architecture was preserved. In some cases, it was possible to sketch many of the structures, and this information was used in the process of estimating the absolute demographic scale of the region (See Appendix C). However, in many cases the structures were either not well preserved, agglutinated and numerous, or the combination of any of these conditions, that make the register difficult and/or impossible for the range of time in mind. In such cases a rough indication of the location and extension of these buildings were made. When possible, we recorded the shape, dimensions, width of walls, and location of them in the settlements, making possible the estimation of roofed area per dwelling, spatial organization and total residential occupation.

The described methods do not permit high accuracy or precision of the measurements, but they are useful for the goals of the present research. The task of capture the variability, frequency and distribution of monumental architecture does not require down to millimeter accuracy, but a coarser resolution (1 to 2 meters) is preferable if it permits to have a complete dataset of the region.

3.1.5 Summary and Survey Results

The survey recorded 2965 survey units with an average extension of 0.51 ha ($\sigma = 0.29$ ha) (Figure 3-4). Some survey units are larger than our limit of 1 Ha because some conditions of fieldwork limits the possibility of subdivide the terrain in an effective way. For instance, sugar canes can grow several meters high limiting the visibility and blocking sound. In such situation guidance by map is the only way to determine the size of each survey unit. However, while surveying these areas we noticed that the arrangement and size of the cane fields or “cuarteles” differs from those of the satellite images and making the task to assess the real area of the units a very hard one during fieldwork. These larger units are not very problematic because they were recorded mostly in areas with low density of artifacts, where general collections were taken, affecting minimally the estimates of frequency and distribution of sherds in the region, which is the proxy for population reconstruction (Figure 3-5).

In general, visibility condition was not a problem, with the exception of those areas with dense vegetation cover such as maize fields, but even in such places both general and systematic collections were made. The fact that most of the collections were taken from areas of good and very good visibility is not product of a bias toward those zones but it indeed reflects the overall good visibility conditions on the desert coast of Peru and the high levels of obtrusiveness of archaeological artifacts in these surfaces (Table 3-1).

Systematic collections and general collections share respectively the 26% and 73% of the total, and less than 1% of the survey units were defined only by either architecture or lithic artifacts, and no sherds collections were obtained (Table 3-2). Only in some few cases architectural remains were not associated with artifacts, while in most of the cases sherds were not associated with any building remain (Table 3-3). This indicates that if architectural remains were a requirement, 67% of the survey units may have been not recorded, and if high density of artifacts (> 1 sherds/m²) were a requirement, 72% may have been left out.

During the process of classification it was noticed that in some samples, rocks were counted as sherds. After fixing this, 13 collections were reduced to less than 4 sherds, lower than the threshold set in

the fieldwork, and consequently they were leaved out from further analyses. This reduce the total number of collections to 2952.

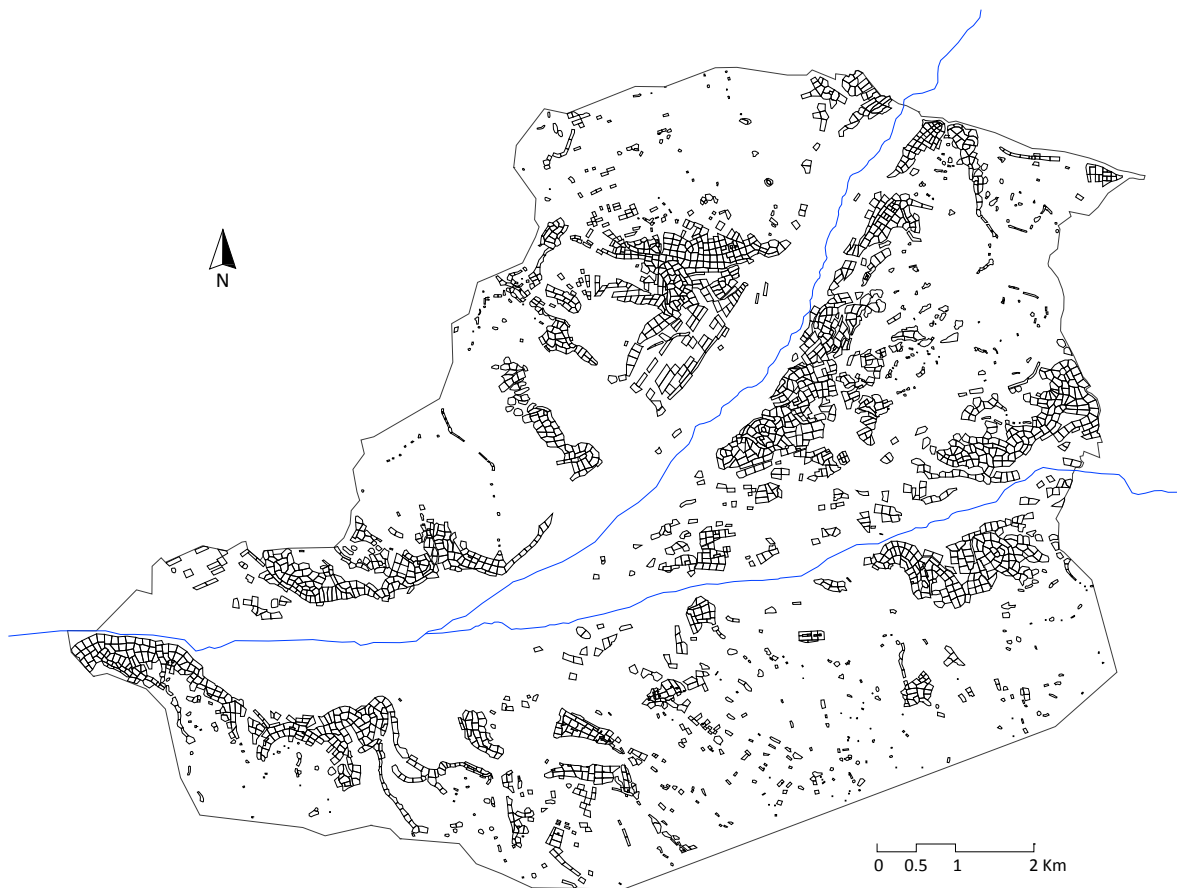


Figure 3-4 Location of the survey units recorded in the fieldwork.

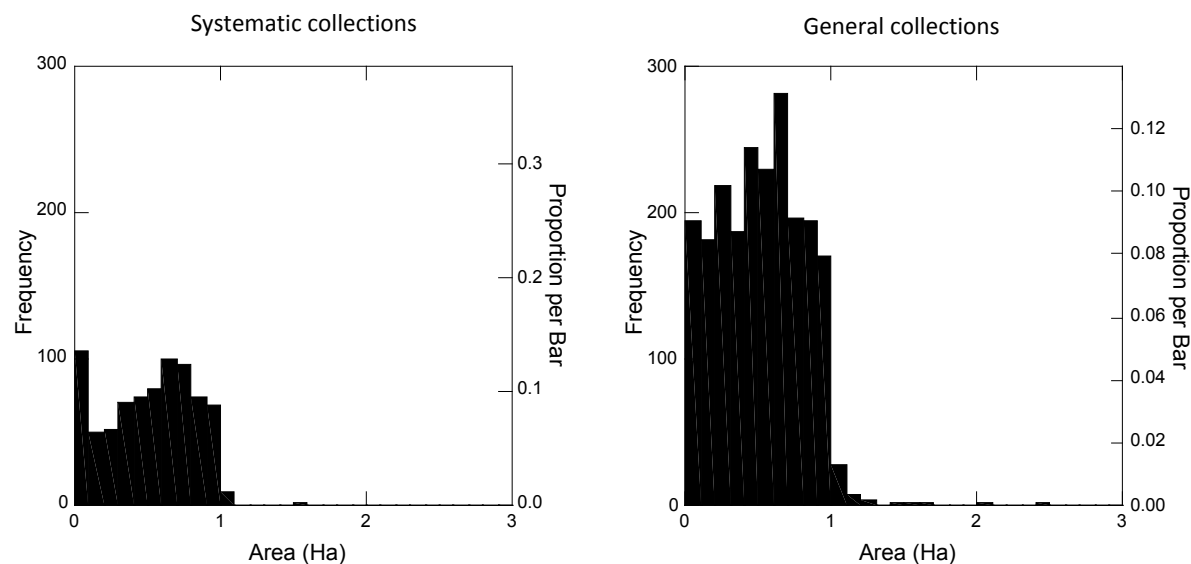


Figure 3-5 Histograms of the area of the survey units.

Table 3-1 Frequency of systematic and general collections according the surface visibility.

Sampling mode	Very good	Good	Fair	Poor	Total
Systematic	472	267	33	1	773
General	966	803	333	52	2154
Other (no sherds)	29	7	2	0	38
Total (frequency)	1467	1077	368	53	2965
Total (proportion)	49.5%	36.3%	12.4%	1.8%	100.0%

Table 3-2 Summary of collections from survey units.

Sampling mode	Frequency	Proportion	Collection Size Mean (sherds)	Collection Size St. dv.
Systematic	773	0.26	40.4	34.3
General	2154	0.73	18	12.5
Other (no sherds)	38	0.01	-	-
Total	2965	1.00	23.6	22.9

Table 3-3 Frequency of systematic and general collections according to the presence of architectural remains.

Sampling Mode	With architecture	Without architecture
Systematic	465	300
General	449	1683
Other (no sherds)	35	3
Total (frequency)	949	1986
Total (proportion)	32.3%	67.7%

A total of 70 583 ceramic fragments were recovered in the collections and include a wide variety of artifacts. Ceramic vessels fragments, used for the demographic reconstruction, sum 70 033 sherds, corresponding to the 99.2% of the sample. The remaining 550 fragments (0.8%) correspond to reused sherd scrapers, reused sherd discs, figurines, molds, panpipes, trumpets, among others, used as proxies for other human activities such as ceramic production and ritual performance.

3.2 CERAMIC CLASSIFICATION AND CHRONOLOGY

The objective of the ceramic classification was to create a method to discriminate surface collections between the different chronological components existing in the sample. Cross-dating is the most common methodology in the Central Andes. Artifacts and assemblages are compared with those from consolidated local and regional sequences and look for stylistic similarities to date archaeological contexts. Despite its relative effectiveness this kind of comparisons are extremely dependent to: a) the existence of diagnostic features such as decorative motifs or time-restricted vessel shapes, b) the permanence, occurrence and preservation of those vessel's parts in which such diagnostic features tend to occur, and c) the relatively synchronization and homogeneity of use of the diagnostic features among the populations under comparison. The present ceramic classification research focuses especially in the second problem, while the first and the third are conditions independent of the methodology of the survey and correspond to specific historical situations.

"Diagnostic" sherds describes those fragments of vessels –but also every other ceramic artifact– which features can provide information related to its function, use, antiquity, ethnic affiliation, etc. In practice, archaeologists tend to prioritize decoration and recognizable vessel parts such as rims, handles,

base section, etc. while undecorated body fragments are considered as non-diagnostic. The main problem with this preference is that only in very rare situations “diagnostic” sherds correspond to the bulk of any systematic archaeological collection. Only with purposive collections programs, biased toward such artifacts, these become abundant in the samples. Because the demographic reconstruction use sherds density as proxy, the analysis of the collections from the Middle Nepeña Valley requires the classification of most if not all the collected sherds, and the only way to this is by the design of a ceramic classification based in the technical characteristics of the manufacture that are widely shared by and present in most of the sherds, while taking advantage of the usefulness of cross-dating to related such types to known chronological sequences.

3.2.1 Ceramic Classification

The ceramic classification was based in the identification of wares (Rice 1987:484), which are classes of pottery whose members share similar technical characteristic of their manufacture. Collections were classified following a hierarchical classification of fabric or paste type, surface treatment, firing conditions, and decorative techniques.

During the survey it was noticed that some collections include a high proportion of diagnostic pottery from different periods. During the daily washing of the sherds, nearly a dozen bags were identified and tagged. These were the bags used to define the initial classification of wares and its dating according to stylistic similarities with the assemblages of know sequences. After this, the other bags were classified and if a new ware were discovered it was added to the list. In some cases, further division of an already defined ware was required when new attributes were discovered in it corresponding to a different period. In such cases, the previous bags were checked. The frequency of identification of new wares decreased with the progression of the analysis.

With the exception of the initial dozen bags, the formal characteristics and decoration of vessels were kept independent from the ware definition and classification. This permit, as a final step, to contrast the consistency of the relationship between wares and its diagnostics features according to know cultural sequences (Table 3-4). A fully explanation of the ceramic classification and the description of the wares are presented in the Appendix B.

Table 3-4 References for cross-dating archaeological assemblages from the Middle Nepeña Valley.

Periods	Valleys/Region					
	Moche	Virú	Santa	Nepeña	Casma-Sechín	Ancash Highlands
Middle Formative		Strong and Evans (1952)		Shibata (2010)	S. Pozorski and Pozorski (1987)	Terada (1979)
Late Formative				Chicoine (2006a), Ikehara (2007), Shibata (2010)	S. Pozorski and Pozorski (1987)	Burger (1992), Mesia (2007), Terada (1979)
Final Formative	Brennan (1978)	Bourget (2010), Strong and Evans (1952)	Wilson (1988)	Daggett (1984), Ikehara (2010a)	S. Pozorski and Pozorski (1987)	Lau (2001), Terada (1979)
Early Intermediate		Strong and Evans (1952)	Chapdelaine, et al. (2009), Wilson (1988)	Proulx (1968), Trever, et al. (2013)		Lau (2001), Terada (1979)
Middle Horizon		Strong and Evans (1952)	Wilson (1988)	Proulx (1968)	Vogel and Vilcherrez (2011)	Lau (2001), Terada (1979)
Late Intermediate			Wilson (1988)	Proulx (1968)	Vogel and Vilcherrez (2011)	Lau (2001), Terada (1979)
Late Horizon			Wilson (1988)	Proulx (1968)		Terada (1979)

3.2.2 Summary and Results

As a result of the ceramic classification and analysis, 32 wares were identified for 5 different cultural periods according to formal and stylistic characteristics (Figure 3-6). The Period I comprises mainly the Late Formative but it is possible the some sherds may correspond to the later part of the Middle Formative according to similarities with the assemblages reported in Cerro Blanco de Nepeña (Shibata 2010). The Period II is placed during the Final Formative and it is coetaneous with Salinar phenomenon, Puerto Moorin or the White-on-Red phase in other valleys of the North Coast (Ikehara and Chicoine 2011).

Period III is equivalent to the first part of the Early Intermediate Period, and before the Moche influence in the region. This period was characterized by material culture of Gallinazo and Recuay styles, and it is similar to Suchimancillo phases of the Santa Valley (Wilson 1988). It is during Period IV when Moche political ideology influenced the communities in the valley. Some wares of Period IV share both

Moche and Huari Norteño designs, which give some insights about the relationship between both styles in the constitution of community identities and political dynamics of the region between A.D. 500 and A.D. 1000.

Finally, Period V involves a long period of time, from the later part of the Middle Horizon until probably the Colonial Era. While decorated pottery can be dated more precisely, the lack of domestic pottery studies and sequences for these late prehispanic phases in the region, was an obstacle to attempts of further division of the Period V.

The distribution of the survey units by period is showed in Figure 3-7. In these maps it is possible to notice the preference of the population in all the periods to occupy the hills and lands at the edges of the cultivable zone. In addition, the lack of occupation in the riverine zone we observed nowadays in the area was already a pattern since prehispanic times.

	<i>Middle Formative Period</i>	<i>Late Formative Period</i>	<i>Final Formative Period</i>	<i>Early Intermediate Period</i>	<i>Middle Horizon Period</i>	<i>Late Intermediate Period</i>	<i>Late Horizon</i>	<i>Colonial Era</i>
PERIOD ->	-	I	II	III	IV	V		
YEAR BC/AD ->	1100-800 B.C.	800-450 B.C.	450-150 B.C.	150 B.C.- A.D. 500	A.D. 500-1000	A.D. 1000-1500?		
LENGTH (CENTURIES) ->		3.5	3	6.5	5	5+		
WARES	I-A	? ----- L2						
	I-B	? ----- R						
	I-C	A3						
	I-D	O						
	I-E	P						
	I-F	Y						
	I-G	X						
	II-A	B						
	II-B		A1					
	II-C		A2					
	II-D		L3					
	II-E		V					
	III-A			T				
	III-B			S				
	III-C			C				
	III-D			Q				
	III-E			N				
	III-F			J				
	IV-A				L1			
	IV-B				F3			
	IV-C				I			
	IV-D				D*			
	IV-E				E			
	V-A					K		
	V-B					F2		
	V-C					F1		
	V-D					H		
	V-E					G		
	V-F					M		-----?
	V-G					U		-----?
	V-H						W	-----?

Figure 3-6 Correspondence between defined wares and cultural periods of the North Coast.

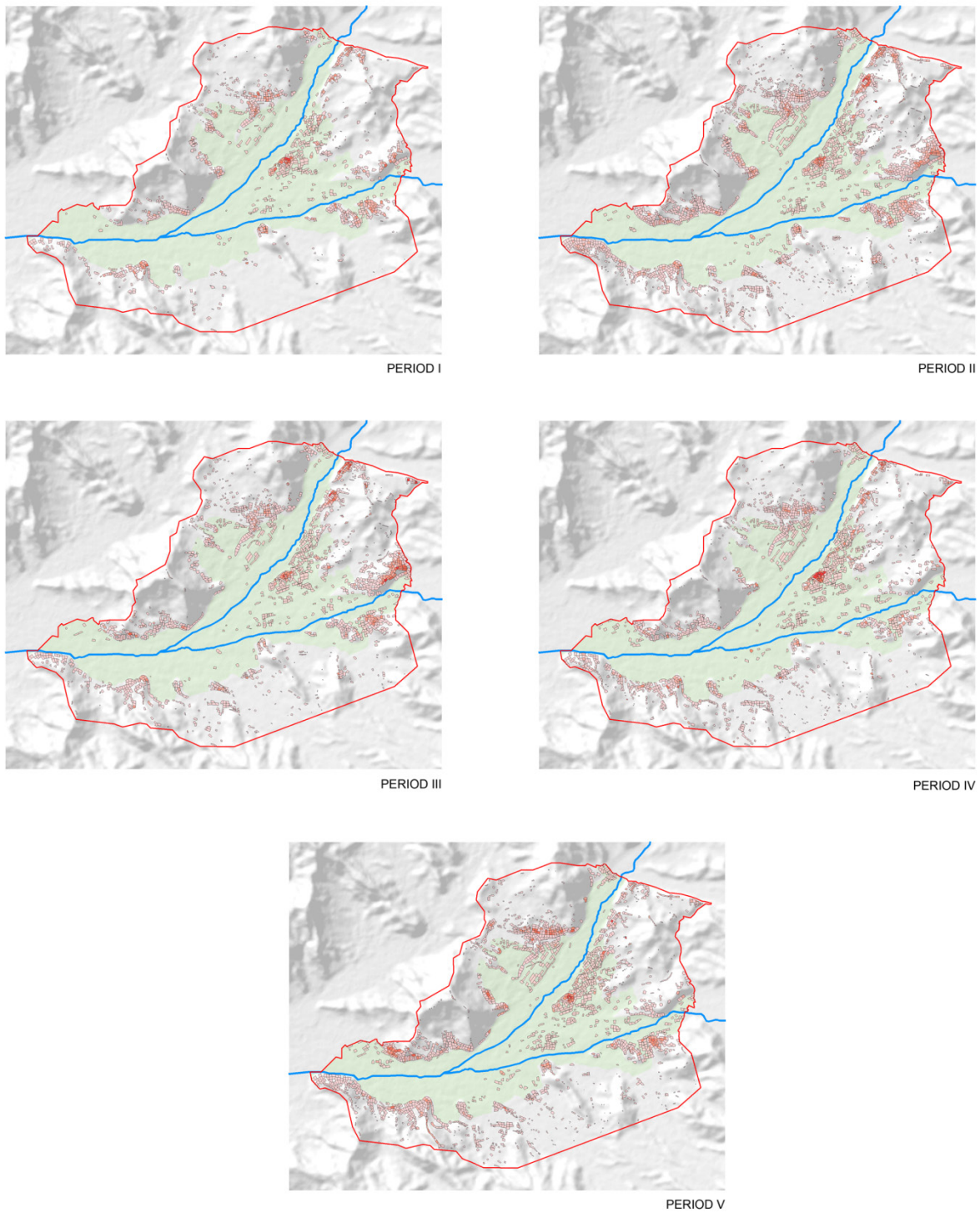


Figure 3-7 Maps showing the distribution of survey lots by period. The intensity of red color indicates the density of sherd in each respective period. The green area indicates the modern cultivable zone, while the blue polylines indicate the Nepeña river system.

3.3 PROXIES FOR THE RECONSTRUCTION OF SOCIO-ECONOMIC PATTERNS

Surface collections also gathered data to be used to reconstruct prehistoric socio-economic patterns. In this research at least three features were of major interest: the identification of higher ranked groups, the patterns of productive differentiation and long-distance exchange of prestige goods. In this sections the proxies for each social feature are presented while the theoretical background, assumptions, expectations, analysis and interpretations are described in the following chapters.

3.3.1 High Ranking Households

To identify leadership households, my approach was to distinguish higher ranking household assemblages, and to do this fairly simply, on the basis of relative proportions of fineware pottery. Fineware were been considered any vessel fragment that showed a highly polished internal and/or external surface. While rough burnishing is typically used to change the mechanical properties of the surfaces of the vessels, polishing usually is carried out to improve the external appearance (Rice 1987).

In the Nepeña Valley, some styles relied more in the use of decorative painting without surface polishing, however this tendency was stronger for later Period IV-V styles such as LIP-Casma or some Middle Horizon local styles, than in Periods I - III styles. A minor consideration is that sherds with decorative techniques involving accretion (i.e. painting), are more easily eroded by exposure to environmental forces. Consequently polished surfaces used to last longer than painted ones.

The identification of the surface treatment was one of the variables included in the ceramic classification and analysis, which was made for each individual sherd. The analysis and interpretation of the higher ranking assemblages are presented in the Chapter 4.0 .

3.3.2 Patterns of Productive Differentiation

For the Middle Nepeña Valley survey, only artifacts pertaining to lithic production, textile production, and ceramic production has been recorded. Neither lithic nor textile production remains were used in my regional scale comparisons. In the case of lithics, despite presence of lithic *debitage* in the survey area (n=704), there was simply no way to reliably and consistently assign these remains to a particular period, except in cases of single component occupations. Thus, they would have added little to my analysis in

terms of comparisons at the larger scales. In the case of textile production, the sample size of spindle whorls was extremely small ($n=3$), although spinning would have been a very common activity.

In contrast, pottery production items were abundant, and were classified in the same way as the rest of the ceramic collection. A total of 365 fragments of molds, reused sherd scrapers, “paleta de alfarero” and “platos de alfarero” was found in 241 survey units. Only fragments of reused sherd scrapers correspond to wares from the Period I, II and III. These scrapers may have been used to homogenize the external and interior surfaces of the vessels by the removing of excess of clay during the leather-hard stage. Similar objects are used today for these purposes (Figure 3-8), and other specimens have been reported for pre-Hispanic populations in other regions of the Central Andes (Anders 1994:Figura 4; Isbell 2007:Figure 3.3: A; Lau 2001:Figure 9.13; Pozzi-Escot, et al. 1994:Figura 11B).

Consequently, the analysis of patterns of craft production will focus primarily on ceramic production, with analysis and interpretations presented in Chapter 6.0 .



Figure 3-8 Scrapers made from reused sherds, and a modern plastic tool of similar function (left). Labels indicate the survey unit followed by specimen number.

3.3.3 Long Distance Exchange of Prestige Goods

Prestige goods include a wide variety of objects, from those of humble manufacture but ritually charged meanings, to highly elaborate objects whose external appearance can be an indicator of its relative importance. Exotics in particular, because their limited provenience or availability, and their high cost of

transportation, are likely to serve as prestige items. The survey zone in the Middle Nepeña Valley, or Moro Pocket, is characterized by natural restrictions on contact with other coastal valleys and the adjacent highlands, such as mountain ranges and desert patches that rise the cost of movement between regions.

For the present research, pottery that would have come from other valleys is considered exotic. Analysis of these exotics provides insights into the role of long-distance exchange in the construction of leadership in the research zone. Based on characteristics of temper or paste, the quality and type of manufacture, decorative style, and known occurrence/production in other regions, three wares from Period I and three from Period III were treated as imports and thus, high value pottery (Table 3-5). No imported wares were recorded for Period II. The analysis and interpretation of the distribution of this exotic pottery is presented in Chapter 6.0 .

Table 3-5 Wares classified as exotics compared with other sites.

Period	Ware	Description	Compare to	References
I	I-B	Fine gray ware	Cupisnique gray wares, Cerro Blanco de Nepeña Fine Gray	Ikehara 1997, Shibata 2011
	I-F	Red slipped, brown ware	Chavin de Huantar's Puksha and/or Wacheqsa A styles	Lumbreras 1993
	I-G	Fine polished black ware	Janabarriu style, Cerro Blanco de Nepeña Fine Black	Burger 1992, Shibata 2011
III	III-B	Fine brown ware	Recuay style	Lau 2002
	III-C	Fine kaolinite white ware	Recuay style	Lau 2002
	III-D	Fine orange ware	Recuay style	Lau 2002



Figure 3-9 Examples of imported pottery or exotics: a) Ware I-B; b) Ware I-F; c) Ware I-G; d) Ware III-B; e) Ware III-C; f) Ware III-D.

4.0 IDENTIFYING LEADERS

The first step in examining leadership was to identify the locations and activities of leadership (higher ranking) households. In Chapter 8, I discuss the ceremonial centers and the ritual spaces where leaders would have been involved in public ritual.

4.1 THE ARCHAEOLOGICAL IDENTIFICATION OF LEADERS

The relationship between leadership, status, and wealth has been the subject of much anthropological and archaeological interest. Hayden and Villeneuve (2010) suggest that leaders accept the extreme level of risk existing in the political game (such as economic burden and violence) because they found economic benefits in it. These benefits can translate into improved conditions of life for their own households. For example, many studies have shown that, archaeologically, the residences of leaders or “elites” differ from those of commoners or non-leaders. However, the variability in preservation of surface architectural remains in the survey area meant that architectural lines of evidence were not systematically useful to identifying high ranking households.

Instead, I identified leadership households based on their consumption patterns (i.e. refuse). Refuse is likely to reflect the kind, frequency, and intensity of activities engaged in by a co-residential group of people (i.e. a household or a neighborhood of households). While some domestic activities are universal, and vary little according to status differences, (Bermann 1993; Cutright 2009), most domestic activities are shaped in some way by the wealth or status of the household, whether it is diet, serving activities, diversity of household possessions, productive activities, or stylistic preferences. Therefore, elements of domestic life, such as craft production, feasting, and acquisition and use of exotics are sensitive indicators of household social differentiation (Costin and Earle 1989; Vaughn 2004). The proportion of fine pottery in a household assemblage is a solid proxy for leadership because wealthier

households, generally, are likely to have leadership (broadly define) roles. More specifically, higher proportions of fine ware for leadership houses can be related to the relative position such households might have had in networks of production, exchange and distribution of this pottery.

For example, higher proportions of fine pottery would reflect the relative success of a household in positioning itself in the community. For instance, if fine pottery was obtained as gifts, it would reflect the relative status and prestige of the household in the community. If it was obtained by trade or exchange, it would be high value material, more likely to be consumed by wealthier/leadership households. Too, fine pottery, may be instrumental for display in the ceremonial and social practices in which serving and feasting occur (Drennan 1976:77). Commensality is one of the political tools exploited by leaders to acquire allies and expand bases of followers (Clark and Blake 1994; Dietler 2001). For these reasons, proportions of fine pottery can be a multivalent measure of social actions, position, and differentiation.

4.2 METHODOLOGY AND RESULTS

The proportions of fineware in each collection was calculated dividing the number of fine pottery sherds by the total number of sherds in it. As explained in Chapter 3.0 , every pottery fragment with highly polished internal and/or external surface was considered as fineware.

In most of the collections, fineware are hardly more than the 20% of the sherds, and the collections with the highest proportions of fineware are scattered in the survey zone for each of the three periods under study. There is some warnings on the use of this raw data for the subsequent analysis and interpretations. First, it is very likely that very small collections are affecting negatively our confidence on the comparisons. Smaller the collection, larger is the potential deviation from real figures. Second, the current approach considers that this garbage correspond to household activities. In that sense, unrealistic high proportions (as visible as small peaks at the right of each histograms) are very likely to correspond to ritual caches or looted funerary contexts. Third, the use of an arbitrary proportion figure to identify higher ranked households for the three periods was not allowed because as seen in Table 4-1, each period have different central indexes indicating not that there were more or less leaders, but that they were differences in the rate of consumption of fine pottery between the three periods.

Table 4-1 Number of survey units and proportion of fineware in each collection.

Period	N	\bar{x}	σ
I	1115	0.158	0.303
II	2425	0.159	0.253
III	1755	0.046	0.161

Consequently data “cleaning” or filtering was required to identify with confidence those places where it is more likely that leaders were living. In many collections, the numbers of assigned sherds are not equal for each period. For instance, in some collections, while a period may be represented by dozens of sherds, only few sherds are assigned for the other periods generating problems of the confidence of fineware proportions in these last ones. In order to minimize this problem, the first step consisted in increase the reliability of the analysis by setting a minimum sample size of 5 sherd per collection per period. This permits to have increments of at least 20% in the assessment of the proportion of fineware, and values at one error range of less than 22%. While error ranges remain large, they are still smaller than those that could be obtained with smaller samples.

The second step consisted in set an upper threshold of proportions at 0.9 per collection per period. This is an arbitrary decision, the threshold could have been 0.8 or 0.7, but for sure is better than not using a threshold at all. It is very unlikely that a household, even the wealthiest ones, may have pottery assemblages of more than 90% fineware, which may correspond to ritual caches. As result, the new samples have different central indexes and distribution (Table 4-2, Figure 4-1).

Because the proportions themselves don’t permit a straightforward comparison with other socioeconomic domains due the wide range of fineware proportions and the different rate of use by period, a different approach was taken. For each collection the proportion of fineware was subtracted with the average proportion for the period, and this result was divided by the standard deviation of the sample. With this method, the fineware proportions is expressed as the numbers of standard deviations. Then the values were classified in four ranks or classes. Rank 4 for those lots inside the range of $\pm 1 \sigma$ from the media, which represents those households with not much higher than expected consumption of fine pottery. Rank 3 and Rank 2 when the values range between 1σ and (including) 2σ , and between 2σ and (including) 3σ , respectively. And finally, Rank 1 when the values were higher than 3σ . In this manner, Rank 1 to 3 represents those households with much higher than expected consumption of fine pottery, and thus, they may be the remains of leaders. With this approach I am not suggesting that there are four

hierarchical tiers for each period, but this classification is a way to systematically carry out comparison, analysis and interpretations with other social variables during and between periods.

Table 4-2 Number of survey units and proportion of fineware in each collection (sherds $n \geq 5$ and fineware proportion < 0.9).

Period	N	\bar{x}	σ
I	253	0.127	0.182
II	1592	0.139	0.184
III	572	0.047	0.118

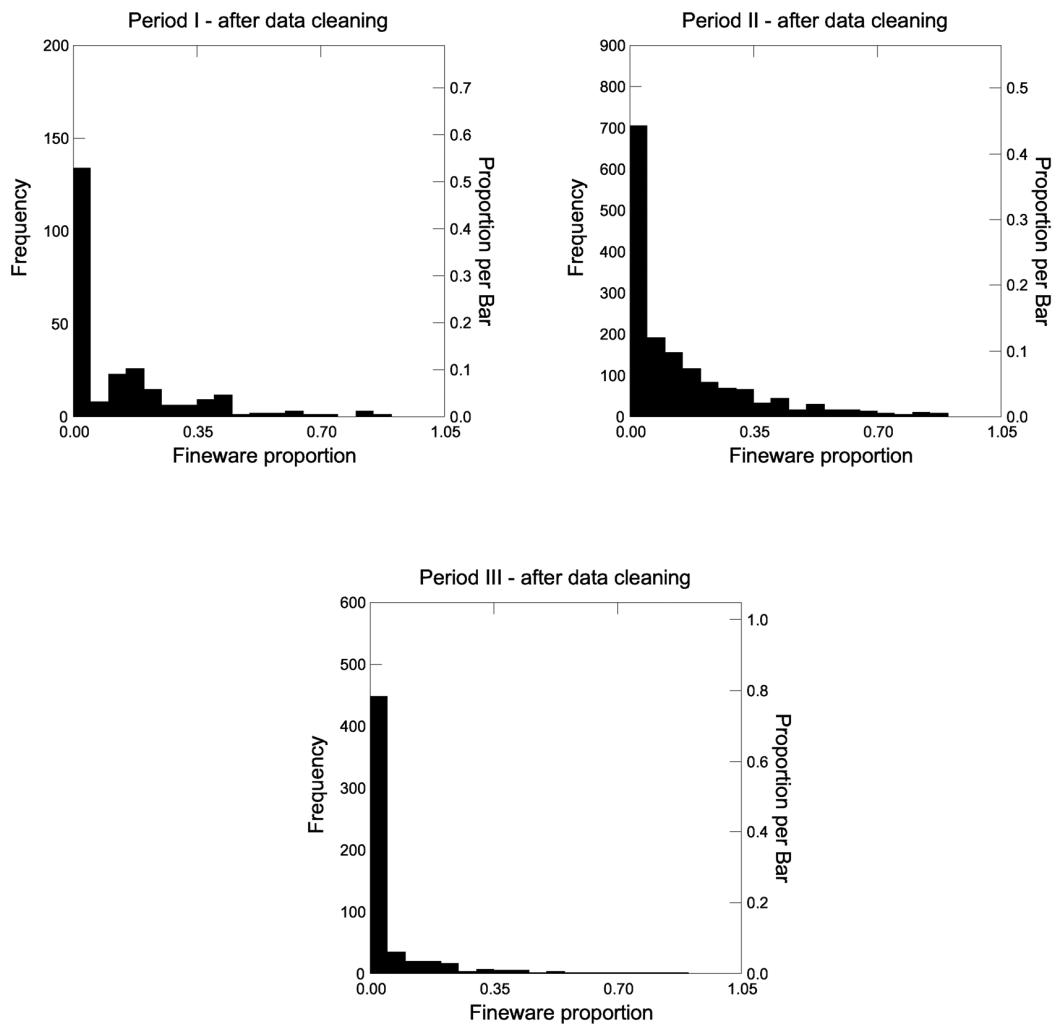


Figure 4-1 Histograms of fineware proportion in each collection by period (sherds $n \geq 5$ and fine. prop. < 0.9).

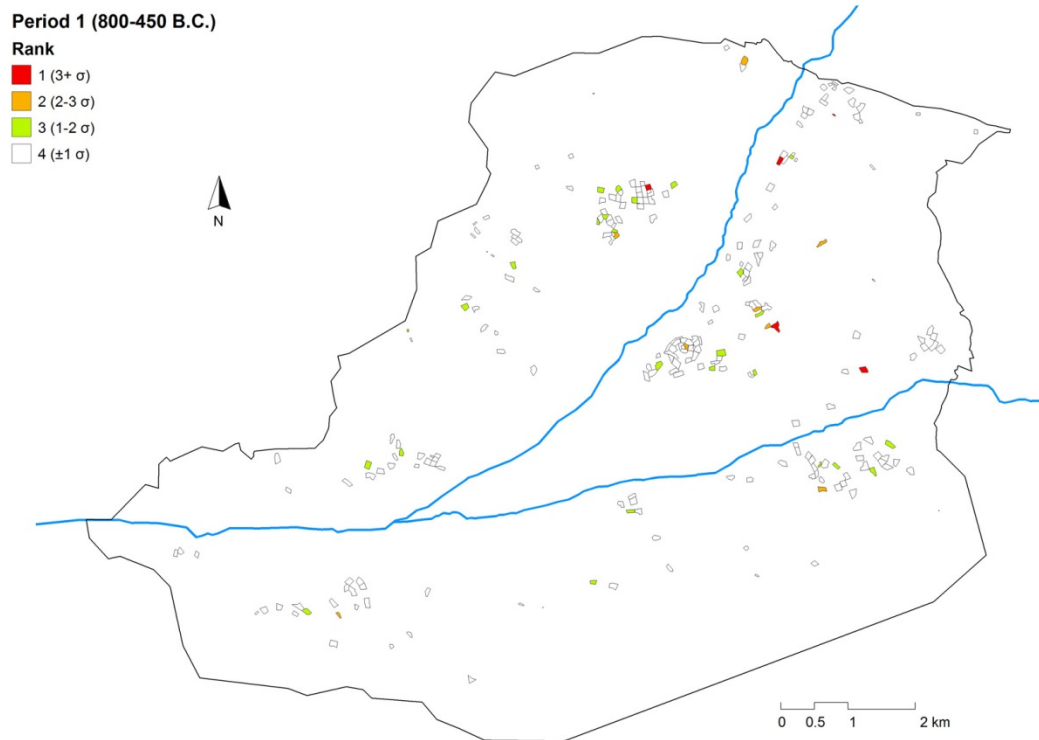


Figure 4-2 Map with the collections for Period I (sherd $n \geq 5$ and fine. prop. < 0.9) according to their rank class.

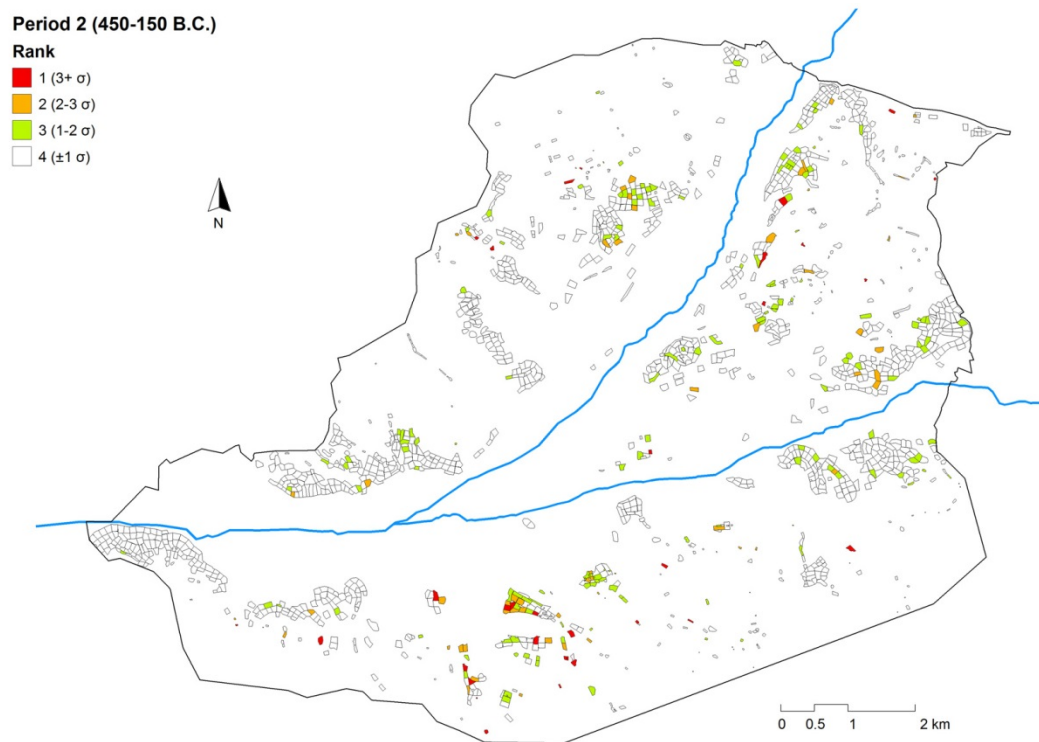


Figure 4-3 Map with the collections for Period II (sherd $n \geq 5$ and fine. prop. < 0.9) according to their rank class.

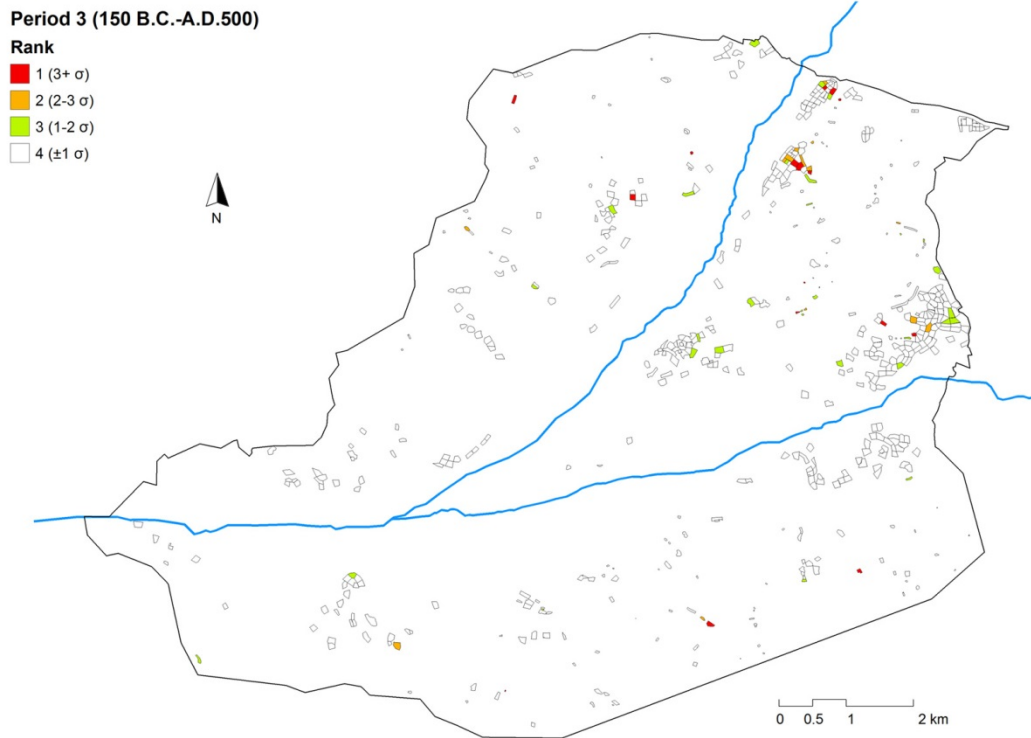


Figure 4-4 Map with the collections for Period III (sherd $n \geq 5$ and fine. prop. < 0.9) according to their rank class.

The maps in Figure 4-2, Figure 4-3 and Figure 4-4 show the distribution of collections with five or more sherds and with fineware proportions below of 0.9, the proposed ranks or classes are displayed in color. These collections are samples from the survey units with a wide variation of artifact density in surface (see Chapter 3.0). If the density of artifacts represents the occupational duration or intensity, these collections may be the garbage left by one individual as well as groups of households, or even neighborhoods. The details of the methodology for the demographic reconstruction is explained in the Chapter 5.0 , but this information is used early in this chapter to explore the number of higher ranked people these collections represents.

If the amount of collections left out by the data cleaning is measure only by its total count, it seems that the remained sample cannot give us an accurate picture of the region because its low representativeness (Table 4-3). However, if the demographic scale of this collections are taken into account, the new dataset does not look that bad at all because it includes a large majority of the people in the survey area in each period (Table 4-4). Despite the analyses and interpretations on leadership described in this and the following chapters are mainly valid for these collections, and the people and households that these represent, it is assumed, being other things equal, that the interpretations may be

also valid for those higher ranked groups or leaders whose assemblages were left out just because the data was insufficient.

Table 4-3 Reduction of the number of collections for analysis after data cleaning.

Period	Original	After Data Cleaning	% of Original
I	1115	253	22.7%
II	2425	1592	65.6%
III	1755	572	32.6%

Table 4-4 Reduction of sample size after data cleaning according to the population estimates.

Period	Original	After Data Cleaning	% of Original
I	1555	1076	69.2%
II	10595	10418	98.3%
III	1529	1298	84.9%

The demographic figures provide an approximation of the average number of people by century that left the garbage (Figure 4-5, Figure 4-6 and Figure 4-7) and the difference in the demographic scale of each survey unit indicates the relative duration and density of the occupation in each location. For instance, an estimate of one person per century in a specific location could mean that in any moment of every century of the period, only one person may have been occupying this place. However, it is more likely that only one household of four or five people could have been occupying the place during 20 to 25 years for every century, and then they have moved out. If the household was of relatively higher rank, it could mean that the obtained leverage was not enough to reproduce the household, or that the maintenance of the social position would have required moving out to a location where power relations could be stabilized.

In contrast, survey units with demographic estimates larger than five people indicates that the equivalent of one household of five members could have been continuously occupying the locale during the length of the period, or that many more households could have left this garbage in a shorter period. If they are classified as higher ranked, the first scenario suggests that these people was successful to reproduce and consolidate in the same location, and the second scenario that these group of families were forming an important node in the network of power in the area during the time of their residence.

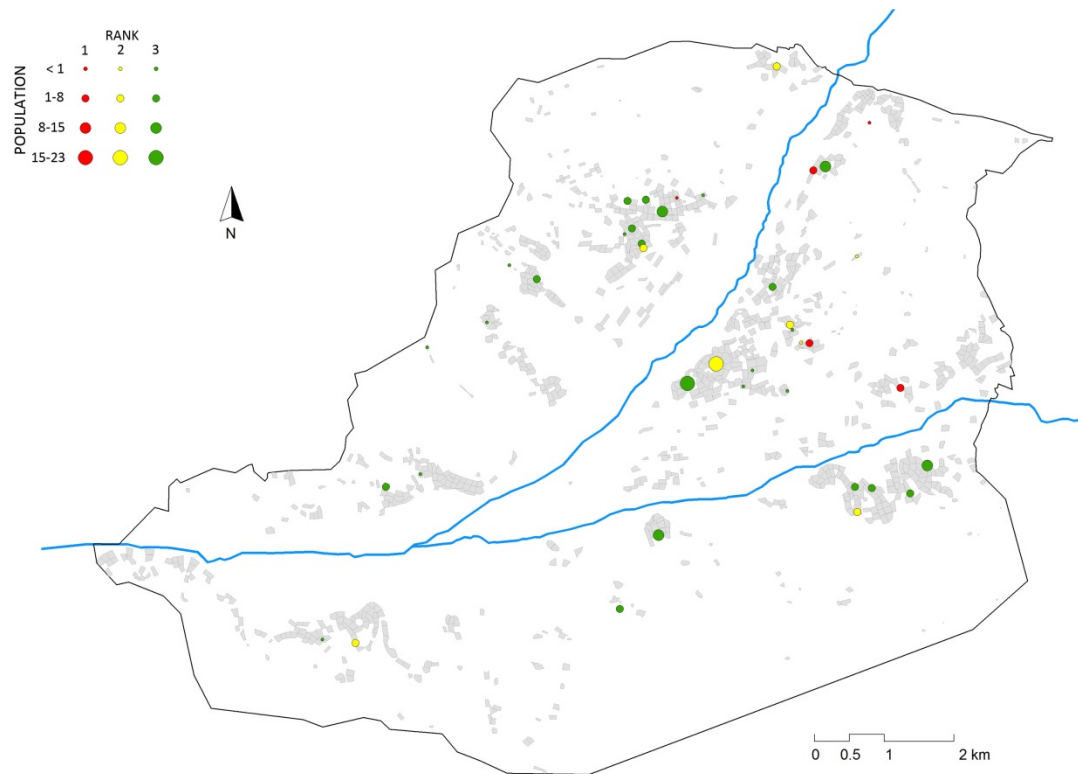


Figure 4-5 Map with the location of leading groups for Period I.

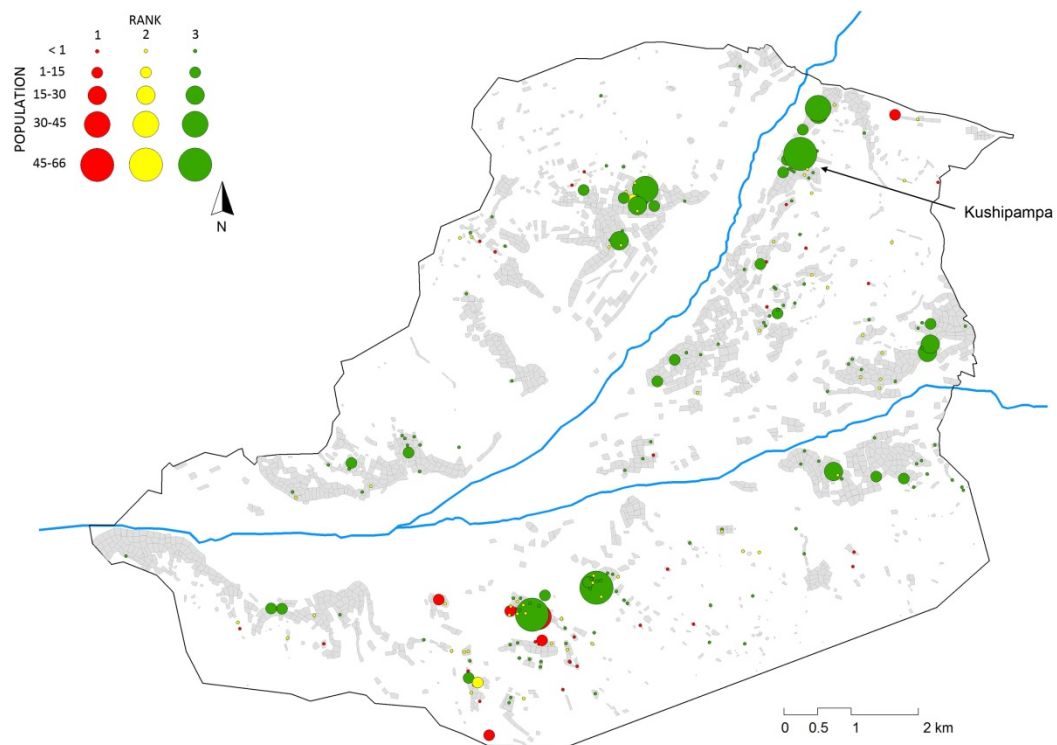


Figure 4-6 Map with the location of leading groups for Period II.

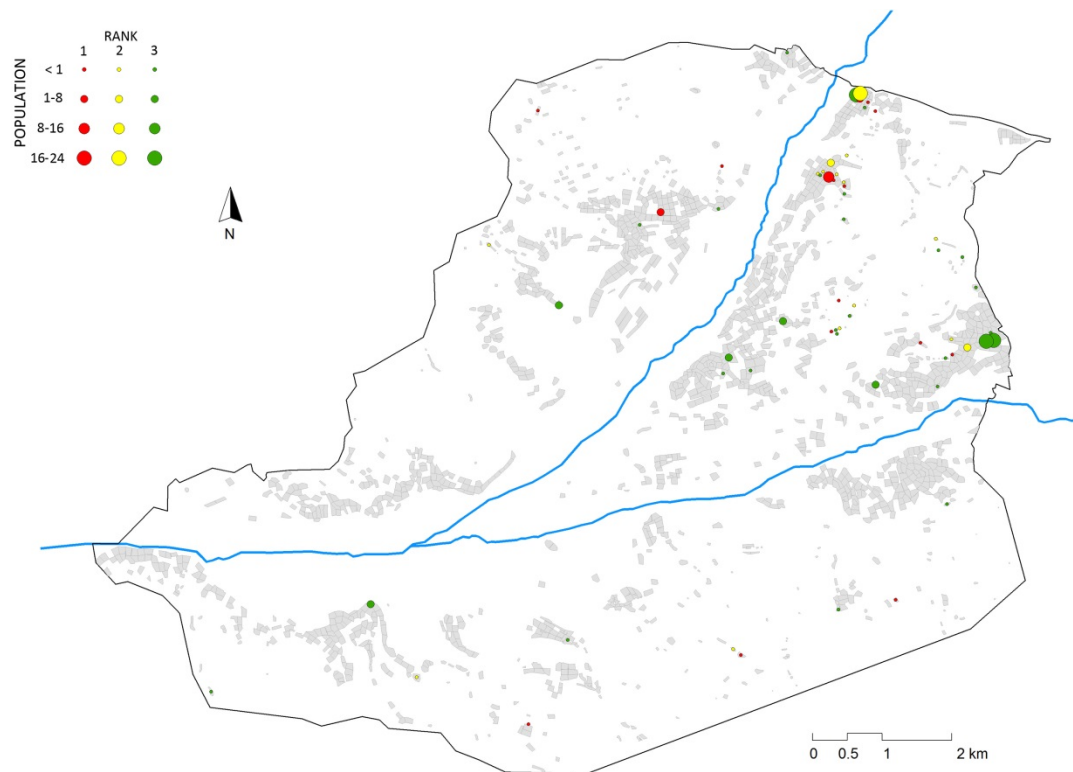


Figure 4-7 Map with the location of leading groups for Period III.

4.3 AN INITIAL EXPLORATION OF PATTERNS OF LEADERSHIP

An initial exploration of the patterns of leadership have the goal to analyze the relationship between craft production, long-distance exchange, and the role of ritual with the emergence of leadership in the region using the database created after the leaving out collections with unrealistic high proportions of fineware, as well those with very low counts of artifacts. The basic assumption is, if any of these activities are intimately related to the constitution of authority positions their related artifacts may be more abundant in leaders' households than in others.

4.3.1 Leadership and the Control over Craft Production

Reused sherd scrapers was used as proxy of ceramic production which constitute the more reliable evidence of craft production in the survey zone (see Chapter 3.0). The ratios of scrapers were obtained

by dividing the number of scrapers fragments by the total number of sherds. This avoid the bias caused by differential densities of artifacts.

The exploration of the data of Period I (Table 4-5) indicates that ceramic production is mainly, if not only, manufactured in Rank 4 households. However, because the small sample size ($N=4$), the confidence that this distribution is not more than a reflection of the rank distribution is low ($\chi^2=0.751$, $p = 0.861$). During Period II, ceramic production was found in households of all the ranks. No rank in special seems to have had preference or exercise dominance over this activity ($\chi^2=2.046$, $p = 0.563$), but there is a tendency of higher ranked households to have higher ratios (intensity of production) in comparison with lower ranked one. During Period III, Rank 1 and Rank 2 collections have proportionally more units with ceramic production than Rank 3 and Rank 4. The difference between this distribution and a random one is highly significant ($\chi^2=7.867$, $p = 0.049$).

Table 4-5 Comparison by rank of collections with evidence of ceramic production for Period I.

Ranks	Total Collections	Collections with Scrapers		Ratio scrapers / total sherds	
		N	% of Total	\bar{X}	σ
Rank 1	5	0	0	-	-
Rank 2	8	0	0	-	-
Rank 3	27	0	0	-	-
Rank 4	213	4	0.02	0.166	0.161
All Ranks	253	4	0.02	0.166	0.161

Table 4-6 Comparison by rank of collections with evidence of ceramic production for Period II.

Ranks	Total Collections	Collections with Scrapers		Ratio scrapers / total sherds	
		N	% of Total	\bar{X}	σ
Rank 1	35	1	0.03	0.697	-
Rank 2	55	4	0.07	0.543	0.021
Rank 3	150	14	0.09	0.378	0.043
Rank 4	1352	93	0.07	0.078	0.095
All Ranks	1592	112	0.07	0.138	0.163

Table 4-7 Comparison by rank of collections with evidence of ceramic production for Period III.

Ranks	Total Collections	Collections with Scrapers		Ratio scrapers / total sherds	
		N	% of Total	\bar{X}	σ
Rank 1	16	2	0.13	0.103	0.057
Rank 2	15	3	0.2	0.172	0.054
Rank 3	30	1	0.03	0.137	-
Rank 4	511	25	0.05	0.140	0.090
All Ranks	572	31	0.05	0.140	0.083

4.3.2 Leadership and Long-Distance Exchange

The proportion of imported ceramics (see Chapter 3.0) from the total number of sherds in each collection was used to approximate to the importance of long-distance exchange in the authority building among leaders' households in the survey area. Imported ceramics were identified for only Period I and III.

During Period I (Table 4-8), Rank 1 and Rank 2 households provide proportionally more collections with exotics, and these collections have in average higher ratios with respect the total number of collected sherds. This preference of higher ranked households to acquire exotics is highly significant in comparison to what would be expected if everybody had the same chances ($\chi^2=14.323$, $p=0.002$).

During Period III (Table 4-9), there is a higher proportion of households with exotics among the higher ranked population (Rank 1-3) than lower ranked one (Rank 4). The difference is not only strong but also highly significant in comparison with what it is expected if the distribution were homogeneous ($\chi^2=99.433$, $p<0.000$). The ratio of exotics versus the total number of sherds is also correlated with rank, indicating that higher the rank of a household, more exotics is consumed by its members.

Table 4-8 Comparison by rank of collections with exotics for Period I.

Ranks	Total Collections	Collections with Exotics		Ratio exotics / total sherds	
		N	% of Total	\bar{X}	σ
Rank 1	5	2	0.4	0.436	0.238
Rank 2	8	2	0.25	0.300	0.141
Rank 3	27	2	0.07	0.055	0.010
Rank 4	213	10	0.05	0.095	0.068
All Ranks	253	4	0.02	0.158	0.158

Table 4-9 Comparison by rank of collections with exotics for Period III.

Ranks	Total Collections	Collections with Exotics		Ratio exotics / total sherds	
		N	% of Total	\bar{X}	σ
Rank 1	16	3	0.19	0.612	0.202
Rank 2	15	7	0.47	0.210	0.133
Rank 3	30	12	0.4	0.155	0.059
Rank 4	511	16	0.03	0.083	0.041
All Ranks	572	38	0.07	0.171	0.162

4.3.3 Leadership and Ritual Practices

The relationship between ritual practices and leadership can be evaluated by multiple ways. In this section only the relationship between the frequencies of panpipes -a common element for ceremonies and rituals- and higher ranked households are analyzed, while the spatial relationship with architectural features of ritual is analyzed in Chapter 8.0 .

The remains of ceramic panpipes found in the survey zone are dated to the Period II. The comparison between the ratios of these remains versus the total amount of sherds in each collection according to rank is show in the Table 4-10. The distribution of collections with panpipes follows the proportions of households in each rank ($\chi^2=0.967$, $p =0.809$), and in general all the ranks have low ratios of panpipes. A simplistic interpretation of this data could be that there is no clear preferences of higher ranked households to be involved in the ritual. However, it more likely indicates that the ritual activities related to playing music are only secondary but still important because Rank 3 households -and not Rank 4- stands out in the comparison.

Table 4-10 Comparison by rank of collections with panpipes for Period II.

Ranks	Total Collections	Collections with Panpipes		Ratio exotics / total sherds	
		N	% of Total	\bar{X}	σ
Rank 1	35	1	0.03	0.027	-
Rank 2	55	1	0.02	0.050	-
Rank 3	150	6	0.04	0.087	0.069
Rank 4	1352	37	0.03	0.064	0.045
All Ranks	1592	45	0.03	0.066	0.048

4.4 SUMMARY

This chapter explained the assumptions and the methodology for identifying leadership households. Potential biases inherent in the fieldwork methodology, and the characteristics of the archaeological record (including the differential degree of preservation) made it necessary to filter the database, leaving a robust sample from which we can identify leadership assemblages with confidence.

During Period I, most of the higher ranked households were living within areas of population concentration. Analysis of the assemblages of these households revealed disproportionate proportions of

Imported artifacts, indicating that one leadership strategy during this period may have involved differential participation in long distance exchange. Equally, such items may have been high value, and thus more likely to be acquired by wealthy households. The former possibility is congruent with the model presented in Chapter 2, in which the manipulation and control over long-distance exchange networks could offer households a more important place in ritual practices during the Late Formative Period.

During Period II, in contrast, many higher ranked households occurred outside of the large population aggregations. With some exceptions, most of these “isolated” higher ranked households were short term, and probably they eventually moved to the village and towns. Elaborate residential architecture, usually labelled “high status residences,” in previous archaeological work in the Valley, has been found in places where I identified leadership households. For instance, while most of the dwellings identified for this period were small circular dwellings (Appendix C), at Kushipampa, where a cluster of higher ranked groups was identified (Figure 4-6), houses were much larger, orthogonal, with stone walls, and sometimes associated with small patios.

During Period II, trafficking in exotics markedly declined with the disintegration of the Cupisnique-Chavín Religious Complex. Pottery manufacture began to be part of the activities of higher ranked households, while, on average, lower ranked households reduced their involvement in this activity. However, the lack of higher ranked households control, even dominance, over the activity suggest that the basis for leadership must be found in other social domains. Instead, a plausible interpretation is that wealthier households were better able to diversify production, devoting household resources to craft production such as pottery manufacture.

During Period III, the strong relationship between pottery manufacture and household rank intensified, although now, the highest involvement in this activity was found in Rank 2 households. At the same time, long-distance networks of exchange were reestablished, and domination in the acquisition/consumption of exotics distinguished leadership households.

This initial set of analyses in this chapter compare interhousehold assemblage differences throughout the survey zone. However, in order to understand leadership, we must examine its expression in the context of meaningful communities, not simply the survey zone as a whole. What were these communities? And how did leaders build their authority through social interaction within these settlement units? The following chapters are devoted to reconstructing the political and socioeconomic organization of the region. How these leaders related to regional demographic and economic patterns is analyzed in Chapter 5.0 and Chapter 6.0 . How leaders’ emergence relates to agricultural potential is

explored in Chapter 7.0 . The relationship of leadership households to loci of ritual and ceremonies is analyzed in Chapter 8.0 . Finally, how these leadership relates to conflict is analyzed in Chapter 9.0 .

5.0 DEMOGRAPHY AND COMMUNITIES

5.1 METHODS OF REGIONAL DEMOGRAPHIC ANALYSIS

The size and distribution of population have been important variables in some explanations of the emergence and development of complex societies (Bandy 2004; Blanton, et al. 1982; Carneiro 1970; Drennan 1987; Johnson 1982; Sanders, et al. 1979; Upham 1987; Wright and Johnson 1975). Consequently, demographic estimates have often been considered a critical, and sometimes controversial, part in the reconstruction of sociopolitical trajectories. Many methods have been used, ranging from the counting of rooms in the settlements to calculating of site areas, assessments based on artifact density (Paine 2005).

Counting rooms has been particularly popular in regions characterized by good surface architectural preservation, such as the Central Andes and the American Southwest. The population estimates are reached by multiplying the number of rooms or structures (i.e. Wilson 1988) or the habitation area (Peterson 2006:71-73) by a constant. Critiques of these approaches have long been noted (Dewar 1991; Paine 2005), and requisite concerns have been built into research designs (i.e. de Montmollin 1989a; Freter 1988). These concerns revolve mainly around the contemporaneity of occupancy of all the structures in the settlement, the functional differentiation of the buildings and rooms, the rate of house replacement and reuse, or the existence of multi-residential households.

Another common method to calculate population is to multiply the area of the site in question by a constant. However, this approach, while more than useful for many issues, also has numerous problems. Schreiber and Kintigh (1996) cautioned that large areas of settlements can be devoted to non-residential purposes (as occurred in the pre-Hispanic Central Andes), affecting the relationship between size and population. Kvamme (1997) replied that a relationship between size and population can be found in their study case, but mathematical transformations have to be applied to the variables. These two arguments put into focus the problem of different occupational density; something that cannot be easily assessed with site area information alone.

A stickier problem in using the area x constant method is that the occupation of a settlement changes through time, so that changes in the density and scale of the local community have to be considered. Correspondingly, some surveys developed effective methods to determine the differences in intensity and the extension of the occupation through direct observation during the fieldwork (Sanders, et al. 1979; Wilson 1988).

The problem of differential occupational density, but also the concerns about occupational length, intensity and variability can be avoided by the use of artifact densities/dispersion as a proxy for demographic reconstruction. These artifacts represents the remains or the refuse of the series of activities that households perform during their lifecycle. The basic underlying assumption is very simply that, “other things being equal, larger populations leave more garbage on the landscape than smaller populations do” (Drennan and Peterson 2011:57).

Households carry out a wide range of activities with different intensity, frequency, and in different loci. A focus on artifacts brings attention to not just those activities carried out in and around dwellings, but also in outlying areas such as agricultural fields. This use of sherds also holds a clear advantage over the use of architecture as the unit of analysis because, in contrast with architectural remains, ceramic vessels have a limited lifespan. Pots need to be replaced, and the frequency depends in the intensity of use of such objects. For example, if dwellings in a settlement are not occupied simultaneously, or have different reoccupation histories, these aspects will be more likely to be visible in the amount of garbage produced in each dwelling, than in the counting of structures (structures can be reused without increasing the area or adding rooms). Finally, utilitarian sherds represent domestic refuse. They show that people were there on the landscape, whether house remains have preserved or not. Thus calculations involving artifact distribution are particularly useful in cases of dispersed, low-density settlement, and in cases where structures were made of perishable materials. It was long customary for archaeologists doing site-oriented regional survey in the Andes to ignore the widely scattered or “handful” of sherds in the landscape, with the dismissive observation that one could hardly walk anywhere in Peru without seeing a sherd or two. This approach led to ignoring a great deal of past human settlement. The use of garbage as proxy for population doesn’t eliminate biases, but it avoids some of the pitfalls inherent in other ways of archaeologically reconstructing population.

5.1.1 Relative Demographic Reconstruction

Sherd densities and their area of dispersion is used as the proxy to determine the size of the regional population. In those survey units where systematic collections were carried out the densities were calculated simply dividing the total number of sherds of all the periods in the collection by the area of the sampling unit. The range of densities varies from 1.25 to 396 sherds per m² with a mode in 15.5 sherds per m² (Figure 5-1), much higher than densities recorded in other surveys with the same methodology such as Chifeng Region in North China (Drennan and Peterson 2011), or Parita Valley in Panama (Haller 2008).

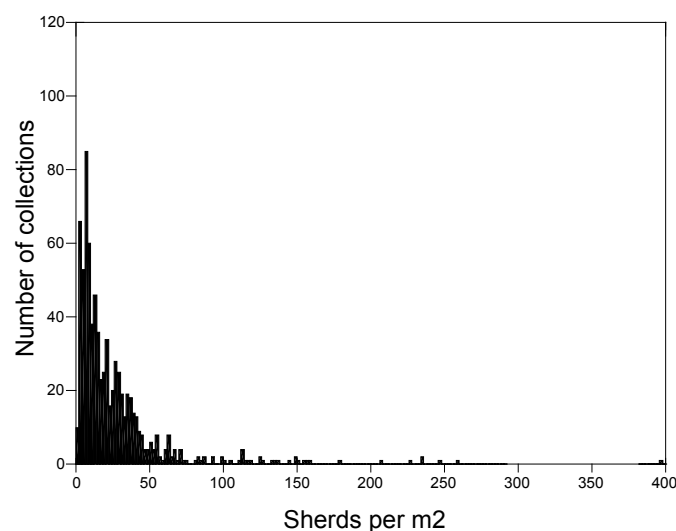


Figure 5-1 Frequency distribution of sherd densities in systematic collections.

A less simple task was to calculate the densities for general collections when artifact sampling was avoided for practical matters, and the collection was obtained randomly picking pottery from the whole survey unit. The following procedure adapts the solution given for a similar problem in the Chifeng Region Survey (Drennan and Peterson 2011).

During fieldwork it was noticed that if a team did not get 10 sherds quickly, it took a long time to get more, and on the other hand if a team collected 11 or more, in many times requires only some few more minutes to reach the target. Consequently, it was decided to use 10 as a threshold between very low and just low densities.

The average survey unit has 0.5 Ha (70.7 x 70.7 m ideally) of area, and each surveyor walked in transects 30 meters apart, then two persons in average should have crossed the area of dispersion. If each person would observed carefully 1 meter each side of their path they would have examined 5.6 % of

the area, and they should have encounter around 31 sherds if densities were around 0.25 sherds per m² or 13 sherds if densities were around 0.1 sherds per m². Then for those general collections with 11 or more sherds a density of 0.25 sherds per m² was assigned, and for those general collections with 10 or less sherds, a density of 0.1 sherds per m² was assigned. In both cases it is assumed that very small sherds are undetectable during the examination of the area.

Once surface sherd densities were obtained, it was required to identify the different temporal components in every sample. The ceramic classification (Chapter 3.0) permitted to separate the sherds of the collections in technological types or wares. Most of the wares had a restricted span of use, and thereby it was possible to obtain the proportions of sherds in each collection that belong to a specific cultural period. Only three wares (II-A, III-A, and IV-D) may have been used in two subsequent periods, and this problem was reduced by using the relative proportions of the other wares with a secure temporal assignment to divide proportionally the problematic wares between the periods. For instance, ware II-A was used in both Period I and II, then its share was proportionally divided using the ratio between sherds of Period I and Period II. Let's have the hypothetical case that in a collection the proportion of sherds from Period II and Period III were 0.1 and 0.3 respectively. If the ware II-A proportion were 0.04, its value was proportionally divided using the ration of 0.1/0.3 to add the resulted values to the Period 1 and 2. Then 0.01 will be added to 0.1, and 0.03 will be added to 0.3 to have a final proportion for Period I of 0.11 and for Period II of 0.33.

Having the proportions of sherds for each period in every collection, these were multiplied by the surface sherd density values to obtain the densities by period. For instance, the collection 709 was obtained in an area with a density of 27.5 sherds per m². The ceramic classification shows that Period I, II and III share the 9.1%, 63.6% and 27.3% of the sample respectively, and the resulted sherd densities by period arrive by the multiplication of these value with the overall density in the survey lot (Period I: $27.5 \times 0.091 = 2.5$ sherds per m², Period II: $27.5 \times 0.636 = 17.5$ sherds per m², and Period III: $27.5 \times 0.273 = 7.5$ sherds per m²).

After sherd densities per period have been obtained they were multiplied by the area of each survey unit in order to obtain the Density-Area Index –DAI- (Drennan and Peterson 2011; Drennan, Peterson, et al. 2003) which describes the density of sherds per m² per hectare of occupation. Because the cultural period have different length, the DAI is standardized dividing it by the centuries that each period last. Then, a DAI/century of 1.0 represents 100 years of occupation over 1 ha at average density of 1 sherd per m². The advantage of this index is that a more compacted settlement, like, for instance, a hypothetical settlement with the same population but in half of area, or a more dispersed one, like a

settlement with the same population but in two times the area, will have the same DAI if in every case the whole settlement is considered as a unit. With the use of DAI this research deal with the problems of differential occupational density, differential occupational length, and several stages of reoccupation of structures in a settlement.

The comparison of the different ways to measure occupational changes through time: by number of collections, by area of collections, and by number of sherds, show similar demographic tendencies with a high peak during the Period II (Figure 5-2). However, the number of collections does not account to the different sizes of the survey units, the area of collections does not account with the differential density of remains, and the number of sherds does not account the area of dispersion or concentration from where samples were taken. The use of DAI/century permits to mix all these variables to create a unique index to compare the relative demographic scales through time. The demographic growth/decrease tendencies between periods are similar whatever proxy is used (with the exception of the tenuous change between Period III and I), but what changes is the rate in which these occur. The DAI/century provides a more accurate picture because it includes in the estimates the length of time in which these garbage were deposited in the landscape. Basically, this comparison shows that the effect of the differential length of each period is strong.

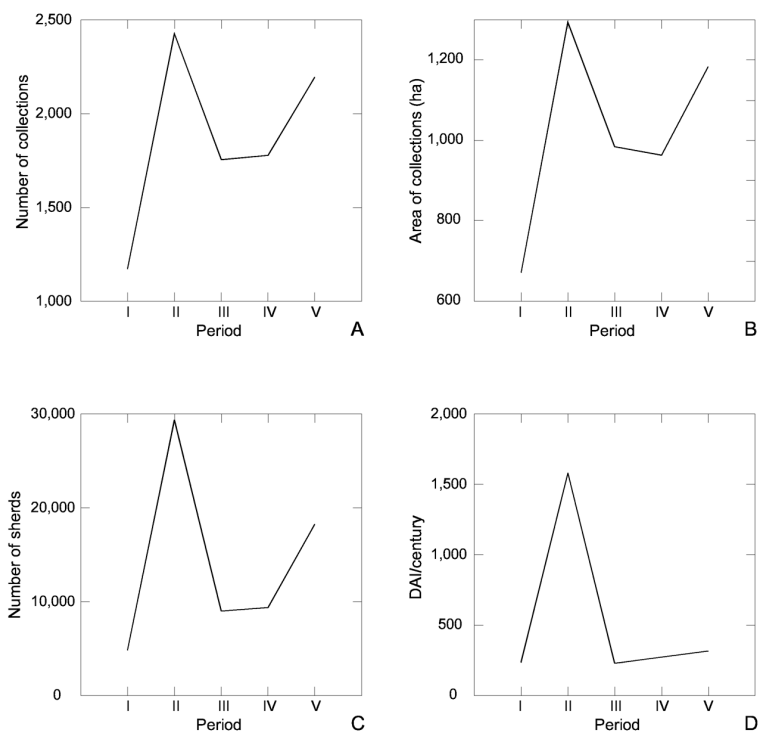


Figure 5-2 Relative demographic estimates for the surveyed area according: a) number of collections, b) total area of collections, c) total number of sherds, and d) density-area index by century.

5.1.2 Absolute Demographic Estimates

Every household invests in their own dwellings so they can carry out or perform their quotidian activities in them with some comfort. At the same time, these activities produce garbage, which could accumulate in the surroundings by several generations. Consequently, it is logic to assume that the amount of garbage may correspond to the number of people living in the domestic structures and the length of the occupation. This is the approach taken in this section to arrive to absolute demographic estimates.

The index of DAI/century represents the average density of garbage left in the territory during each century of a specific cultural period. These garbage not only are those produced by a household in their residence, but also these are the remains of any activity carried out by people that involve ceramics vessels. To relate the number of people from a hamlet, village or town with the surrounding garbage is only an attempt to provide absolute figures to the scale of the group under study.



Figure 5-3 View of a dwelling from survey unit 1773.

Despite hundreds of domestic structures were recorded and drafted in the survey zone during the fieldwork (i.e. Figure 5-3), only sixteen groupings were selected as cases to determine the relationship between human group size and the amount of garbage in the surroundings. It is assumed that the garbage of a group of households can be dispersed up to 50 meters from them (See Appendix A), and consequently the garbage discarded by a group of people or a series of households must be found in contiguous survey units, and not only in the one that contain the dwellings. These cases were selected

because it was possible to determine with confidence which survey units contain the garbage that must have been left by the occupants of the selected dwellings. The description of these cases are presented in the Appendix C.

The relation between house structures and numbers of occupants have been focus of intensive discussion. For instance, Wilson (1988:78) uses the estimate of 5 persons per structure after the work of Haviland (1972) and Naroll (1962), to reconstruct the population scale in the neighboring Lower Santa Valley. However, considering the variability in sizes and shapes, and the multiple structures that may correspond to a household unit, an alternative approach based in house floor area was taken. Peterson (2006:71-73) reviews several ethnographical sources and ethnoarchaeological studies on the relationship between dwelling sizes and number of occupants reaching the conclusion that typical ratios vary between 4 to 6 m² of roofed space per person.

After leaving out those structures with roofed area smaller than 4 m² (which is not very likely to be residences), a minimum population estimate was reached using the ratio of 6 m² per person for the total roofed area in each selected case, and the maximum population estimate was reached using the ratio of 4 m² per person. The 10% trimmed mean of the ratios of population versus DAI/century were calculated in order to reduce the influence of outliers, and the following relationships was obtained:

$$\text{Minimum population (Pmin 100\%)} = 7.158 \times (\text{DAI/century})$$

$$\text{Maximum population (Pmax 100\%)} = 10.737 \times (\text{DAI/century})$$

$$\text{Average population (Pavg 100\%)} = 8.948 \times (\text{DAI/century})$$

However, the previous equations consider 100% of continuous occupancy. It is more realistic to assume that only 75% of the structures were used at the same time, or only the 75% of the length of the period, then the following relationships apply:

$$\text{Minimum population (Pmin 75\%)} = 5.369 \times (\text{DAI/century})$$

$$\text{Maximum population (Pmax 75\%)} = 8.053 \times (\text{DAI/century})$$

$$\text{Average population (Pavg 75\%)} = 6.711 \times (\text{DAI/century})$$

With these equations, the absolute demographic scale of the communities of the Middle Nepeña Valley was obtained (Table 5-1, Figure 5-4). For sake of simplicity, the dissertation will refer henceforth to the average population estimate based on the 75% occupancy of the structures (Pavg 75%) when

discussing population scales. These figures indicate a dramatic population increase during Period II, the Final Formative, followed by a dramatic decline during Period III or the Early Intermediate Period. Demographic fluctuation in the survey zone could have had strong influence in the way communities were political and economically organized. After all, it has been argued that it is not the same to organize couple thousands of people than ten thousand (Upham 1987). This dimensions of social change are explored and analyzed in the following sections. In addition, it is plausible that, immigration and emigration processes would have contributed in the demographic transitions of Period II and III. This hypothesis will be evaluated in Chapter 10.0 , when the trajectory of the valley is analyzed in its regional and historical context.

Table 5-1 Population estimates for the surveyed area by period using relationships A and B.

Period	Dates	Total DAI/century	Pmin (100%)	Pmax (100%)	Pavg (100%)	Pmin (75%)	Pmax (75%)	Pavg (75%)
I	800-450 B.C.	231.7	1658	2488	2073	1244	1866	1555
II	400-150 B.C.	1578.7	11300	16951	14126	8475	12713	10595
III	150 B.C.-A.D.500	227.6	1629	2443	2036	1222	1832	1527
IV	A.D. 500-1000	269.4	1928	2892	2410	1446	2169	1808
V	A.D. 1000 - s.XVI	312.2	2235	3352	2793	1676	2514	2095

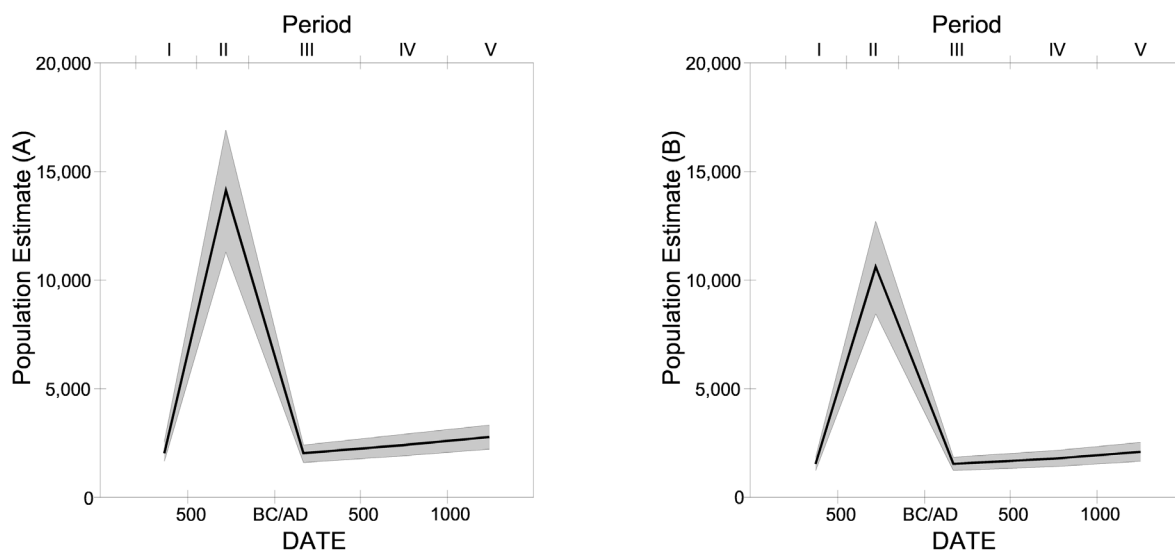


Figure 5-4 Maximum, average and minimum absolute demographic figures by period for the surveyed area using relationships A and B.

5.2 LOCAL AND SUPRALocal COMMUNITIES

Communities are constituted in the patterned interactions between households (Peterson and Drennan 2005). Because these interactions are central to everyday life, and because the costs and inconveniences increases substantially with distance in absence of modern technologies of transportation and communication, households can be expected to locate their residences and focus their activities close to those which they frequently interact (Drennan 1988; Peterson and Drennan 2005; Stone 1993). Consequently, “it is reasonable to expect that, especially in premodern contexts, patterns of interaction, and thus social communities, will be broadly reflected in patterns of spatial distribution of residence” (Peterson and Drennan 2005:6).

These structures of interaction exist simultaneously at different scales in a given region. Consequently, there is no an ideal scale they can be studied, but it is the very process of the discovering the scales in which communities interact a real challenge (Peterson and Drennan 2005). On the one hand, a group of households may interact intensely with each other, and much less with other households. These highly interacting households would place their residences close each other, and their recurrent activities would leave archaeological remains in clear spatial clusters separated from others. This is what archaeologists tend to identify as archaeological sites, or spatially discrete units, usually interpreted as hamlets, villages or towns. However, there are cases in which the distribution of archaeological remains are not that clear and the existence of local communities of interaction is a question for explicit analysis (Peterson and Drennan 2005, 2011). On the other hand, these households could engage in larger scale networks of interactions, in which distance plays a less but still critical role. These larger social units, usually described as districts or polities, are configured around activities that requires less frequent interactions but in many cases larger scales such as collaboration in public works, massive ritual aggregations, etc.

How to delimit these clusters of intensive interaction have been widely discussed in archaeology. Methods range from the simple identification of occupational gaps (i.e. Billman 1996; Wilson 1988), the use of topographical features (i.e. de Montmollin 1989a) or central places as references (i.e. Thiessen polygons in: Hodder and Orton 1976), mutual visibility and stylistic similarities (Arkush 2011), to complex mathematical models to identify both clustering patterns and affiliation (i.e. Alden 1979; Ladefoged and Pearson 2000). Most of these methods rely in archaeological sites as units of observation and analysis, an approach avoided in the present research.

The method followed in this section, suggested by Peterson and Drennan (2005), uses the densities of surface artifacts and its distribution to determine at different scales the existence of patterns of interaction between households. The survey units with their respective surface densities by period were rasterized into a grid of z-values at a resolution of 0.25 ha (50 by 50 m)⁷ GIS cells. Those areas where archaeological remains were not found received a z-value of 0.0 because these are not missing data but it indicate absence of population. This procedure avoid the artificial data filling by interpolation in the following steps.

Tridimensional surfaces maps based in sherd density data was created in the same way tridimensional topographic maps are created with elevation data. Several maps were created by data transformation in which the influence of distance was modified. Mathematical smoothing of the grid was carried out by the use of the inverse distance to a power method, which assign to each cell a new value based in the weighted average of all the z-value of the grid. The weights are equal to one over the distance between z-values raised to some power (Golden Software Inc. 2002:114-115). Increasing the power augments the effect of the distance and only close z-values have significant influence in the final value of each grid cell. In contrast, decreasing the value of the power reduces the effect of the distance permitting distant z-values to have more influence in the final value of each cell. Each period grid was systematically analyzed with the powers 4, 2, 1, 0.5, 0.25 and 0.001 because it is impossible to determine beforehand at which scale the patterns of interaction are detectable (Peterson and Drennan 2005). The results for each period are presented in the Figure 5-5, Figure 5-6, and Figure 5-7.

The unsmoothed surfaces, at power 4, represent regional occupational distribution. Contour lines based in these surfaces were used to delineate clusters of contiguous occupation. The Figure 5-8 shows maps with the cutoff contour that delimit the bases of the peaks in the surfaces. When these cutoff contours are contrasted with the distribution of the survey units with evidence of occupation in each period, it was noticed that there is not clearly demarcated occupational clusters. Instead the population distribution in the region can be interpreted as a continuous one with several areas of high demographic density surrounded by lower densities areas. People were not organized in clearly demarcated local communities, but instead, they were dispersed in the whole region and some households were living more close each other in specific areas.

⁷ The polygons and the associated database were digitized and linked in AutoCAD Map3D 2014, and converted into raster files in IDRISI Selva.

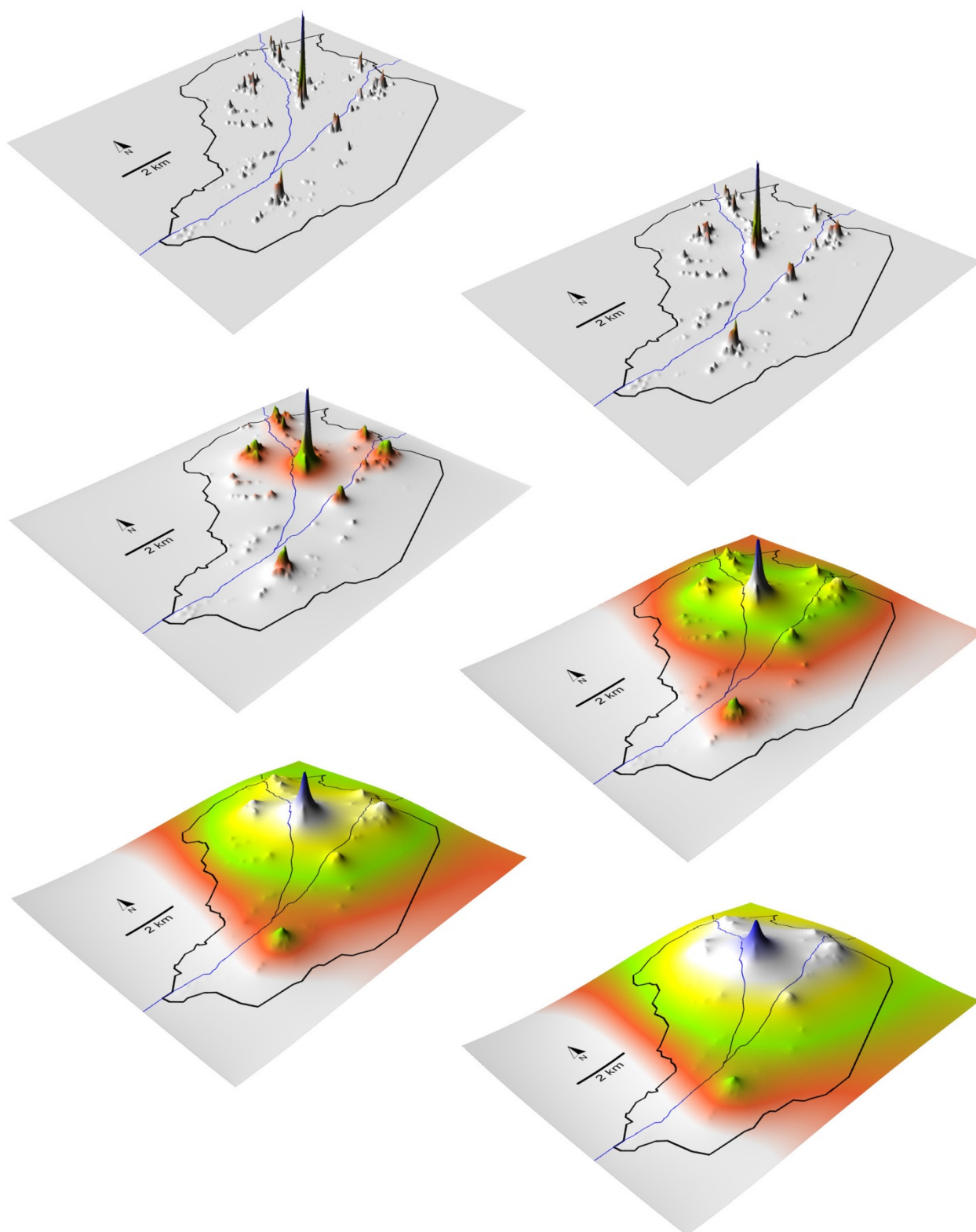


Figure 5-5 Surfaces representing Period I community interaction. Smoothing increases from top to bottom, with inverse distance powers of 4, 2, 1, 0.5, 0.25, and 0.001 respectively.

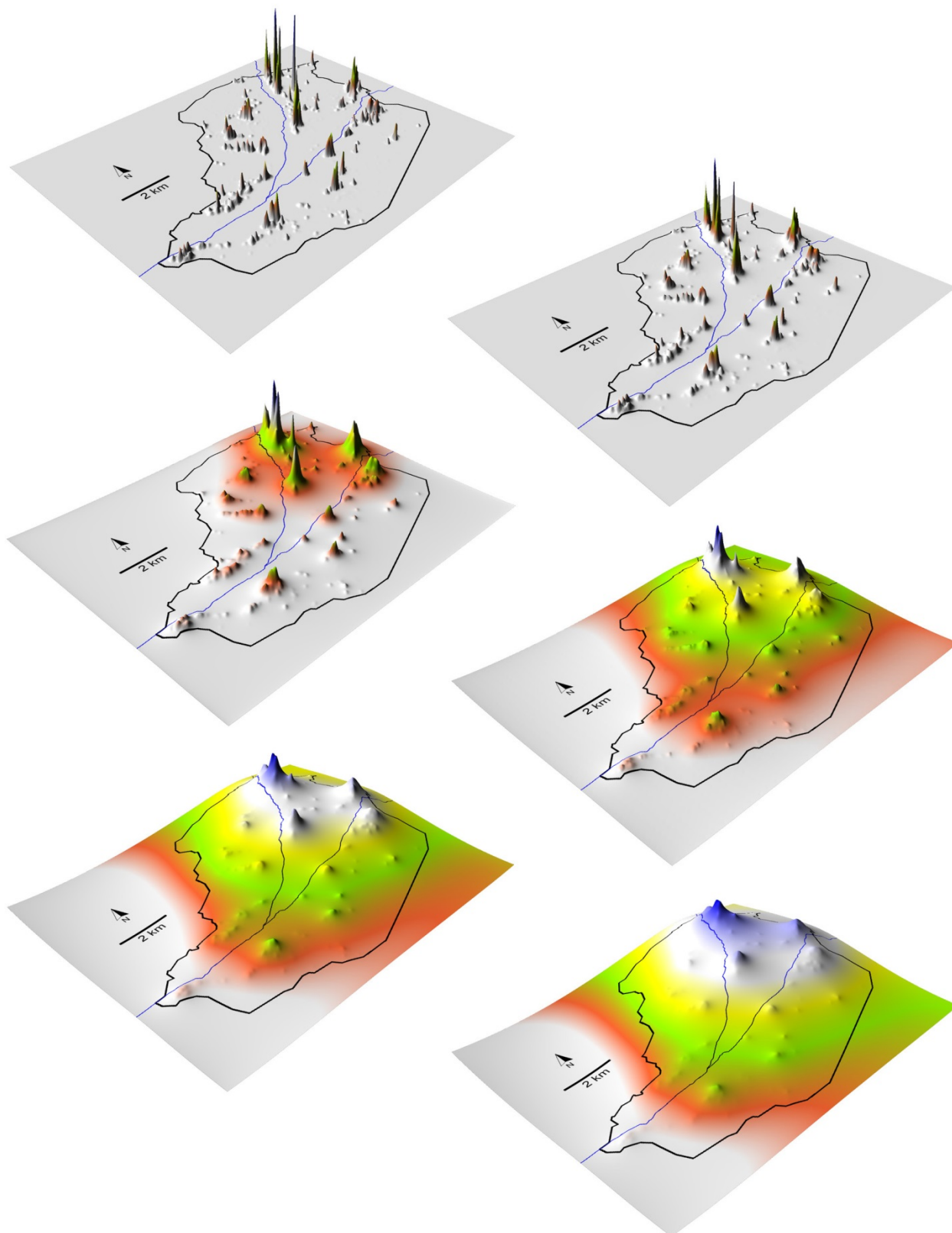


Figure 5-6 Surfaces representing Period II community interaction. Smoothing increases from top to bottom, with inverse distance powers of 4, 2, 1, 0.5, 0.25, and 0.001 respectively.

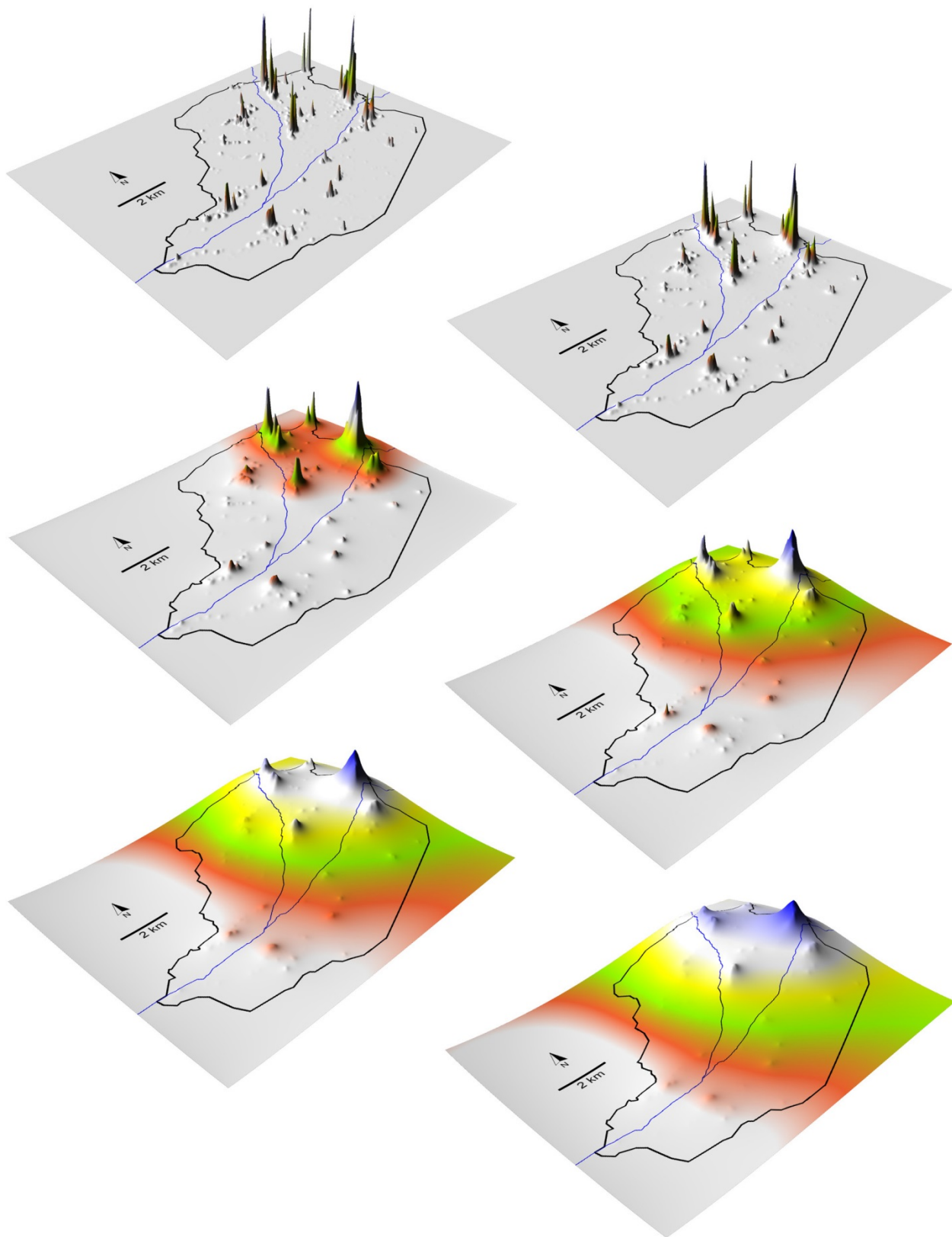


Figure 5-7 Surfaces representing Period III community interaction. Smoothing increases from top to bottom, with inverse distance powers of 4, 2, 1, 0.5, 0.25, and 0.001 respectively.

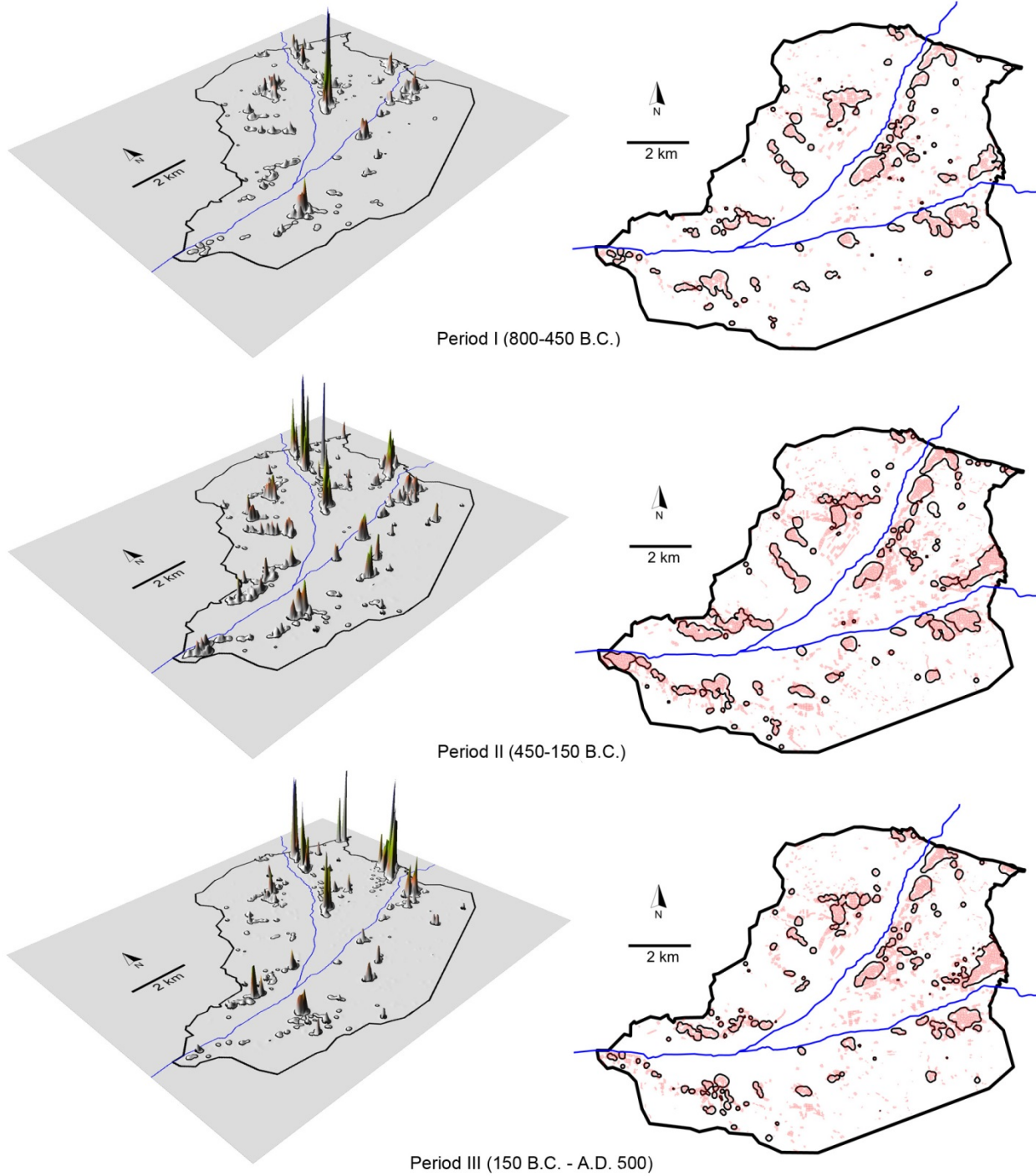


Figure 5-8 Very low cut-off contour lines from power 4 surfaces used to delimit clusters of households or local communities, for the Period I, II, and III, respectively. The red shade in the right indicates the survey units with occupation for each period.

Increasing mathematical smoothing was used⁸ to discover larger-scale structures of interaction in which larger population concentrations have a larger influence due the decreasing effect of the distance. For instance, a large town is characterized by strong socioeconomic links between their households, but also it became a node of social, economic and political interactions in a region. It is very likely that dispersed households and/or those organized in smaller villages do have relationships with such larger settlement. The methodology of analysis proposed by Peterson and Drennan (2005) shows this intensity of relationships as surfaces. After this, a cut-off contour is subjectively selected from the contour maps generated from the surfaces to delimit the extension of the supra-local communities (SLC) or districts. One kilometer can be considered as a upper limit in which daily face-to-face interaction can shape local communities (Peterson and Drennan 2005:10), consequently cut-off contour delimiting areas smaller than 1 km² was not interpreted as a supra-local community.

The increasing smoothing of Period I data (Figure 5-5) merges the smaller peaks over a large surface. The fact that the central peak remains so dominant despite the increasing smoothing indicates that we are observing a supra-local structure with centralizing demographic tendencies. After choosing a cut-off contour generated from the power 1 surface, two supra-local communities or districts were delimited (Figure 5-9). The gap of around 2 km was occupied by small hamlets or isolated households.

The surface of power 4 for Period II show numerous peaks, many of them disappearing during the process of smoothing (Figure 5-6). However, in contrast with Period I surfaces, there is no a clearly dominant peak but at least four of them. This fact impedes to consider the region as integrated in only one supra-local community, but the subsequent delineation indicates, in contrast, high degree of fragmentation. The survey zone was divided in twelve districts of different size using a cut-off contour from the power 1 surface (Figure 5-9). Some of the largest peaks survive the process of smoothing and “valleys” or gaps are visible between them. In some extent these gaps correspond to the riverine zone, but in general, rivers should not be taken as an absolute limitation, considering that they are easily passable only during most part of the year. These gaps were used to delineate the boundaries between adjacent districts, as it has been done in other regional surveys (Chifeng International Collaborative Archaeological Research Project 2011; Drennan, et al. 2006; Peterson and Drennan 2012).

For Period III, the surfaces (Figure 5-7) show an eastward movement of the population and aggregation into four large, dense areas. The cut-off contour taken from power 1 surface, and the division based in the gaps between peaks, delineated five supra-local communities or districts (Figure 5-9).

⁸ Surfer 10 was used for the creation of the grid files, the posterior mathematical smoothing and the final display.

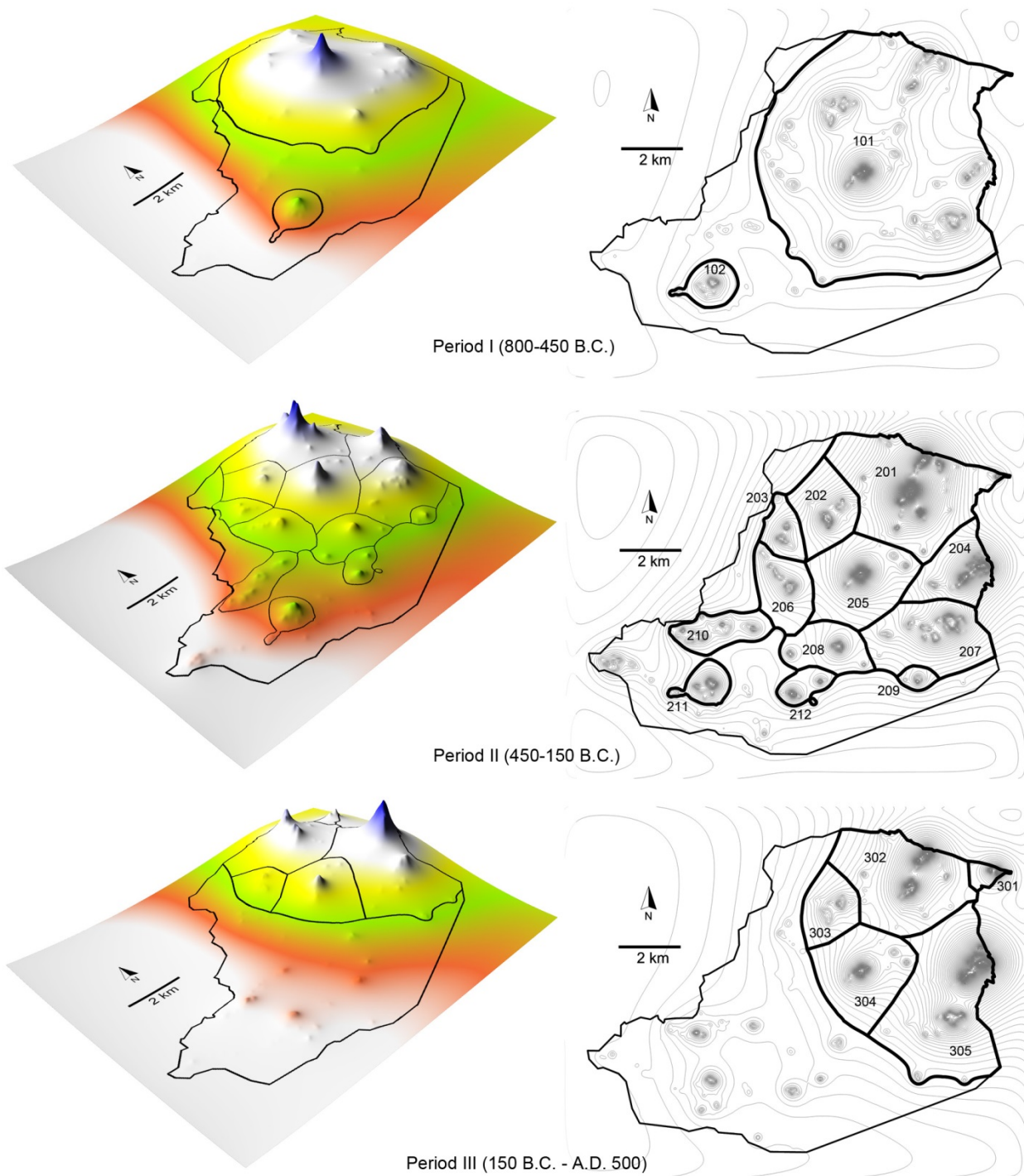


Figure 5-9 Very low cut-off contour lines used to delimit supra-local communities or districts for each period. Cut-off contour lines from power 1 surfaces were selected at right, and displayed at left with surfaces smoothed with power 0.001, power 0.25, and power 0.25 for Period I, II and III, respectively.

The survey zone boundaries delineation was arbitrary and based on topographic features and modern infrastructure. This is an important topic to discuss in order to understand the limitations of the delineation of the communities and the analyses based on them. The northwest and south boundaries do not cut any of the defined districts, but the north and west boundaries may do. The north boundary in the east or left side of the Nepeña River follow an abrupt change in elevation causing a sudden shift from alluvial terraces terrain to valley bottom. As visible the whole survey area, it is very likely that human occupation will be low in the bottom of the valley in comparison with the edges and hills (Figure 5-10). Consequently the definition of districts and the subsequent analyses may no change even if the survey have continued few kilometers north.

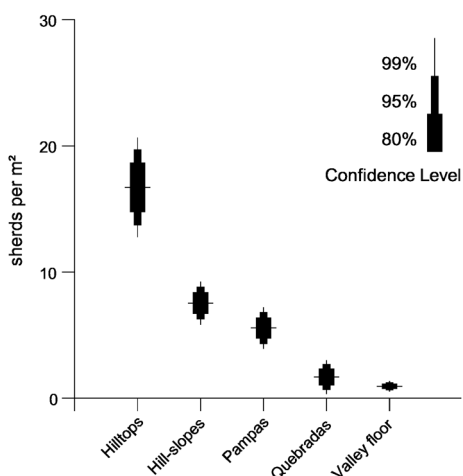


Figure 5-10 Bullet graphs of the density of surface artifacts by topography.

The boundary in the right side of the river, in contrast, was defined by an arbitrary line, but the low density of occupation in that section -because the narrowness of the valley- reduces the concerns about any effect of large concentrations of population missed in the few hundreds of meters after the survey boundary. Occupation is apparently continuous up to Jimbe according to the information provided by Daggett (1984), but I doubt that any settlement was of the scale and density of Kushipampa (demographic center of SLC 201), and thus it is not very likely that boundaries may change drastically if the survey have continue further north. The next concentration of Daggett (1984)'s Early Horizon I, II and III sites is located approximately 2 km north from the survey boundary, distance enough to delimitate a new district if the population in the area is large enough.

The east boundary was defined by the modern road and one lateral road which run along dry ravines or *quebradas*. It is possible that for Period II and III occupation continues outside the survey

boundaries. Daggett (1984) did not present data on that area, but with the provided information it is impossible to determine if this is so because the area was not surveyed or there were no sites. Consequently, an early warning is given for the boundary-sensitive analyses carried out for the SLCs 204, 207, 301 and 305.

In other surveys, the spatial division inside regions usually attempts to identify political units, or territories managed under one specific organization, and this is usually carry out identifying in the first place the political centers and then try to delimit the boundaries between them. In contrast, a supra-local community, as described and delimited above, implies a territory in which the households have strong interaction defining demographic districts, and which demographic centers correspond to the largest concentrations of population. However, whether these districts represent autonomous political units or not requires the reconstruction and analysis of several other social dimensions.

The districts could be delimiting real social units, but they could be also error artifacts resulted from the systematic use of the method. For instance, can a “district” of few dozen people be considered as a supra-local community or just a town? However, the analysis of different social dimensions allowed me to analyze how they were interrelated. For instance, usually a polity encloses a territory with a specific political organization. However, I ask: Are the demographic centers, usually densely inhabited towns, attractors for other households in the district or not? Do districts and demographic centers correspond to the location of the ceremonial centers or not? Do district boundaries correspond to economic units or not? Does population distribution correspond to agricultural potential or they could be the result of other factors? These questions are assessed in the following sections and chapters.

5.3 SPATIAL DEMOGRAPHIC PATTERNS

The size of the population supporting a leader can be a proxy of his/her relative power in a region. Powerful leaders may have larger households (Ames 1995; Santley 1993), but by marriage, alliances, and by attracting followers, larger groups can form to support a leader in political action (Brumfiel 1994). When a political unit had a clear demographic dominance over a region, and no competitor(s) can challenge them, the region was very likely consolidated under a common hierarchy. However, if units were equivalent in size, the situation may be one of peer-polity interaction and competition (Allen 2008).

In such cases, alliances between political units are a pre-condition for any attempt at regional political consolidation.

The analysis of distribution and organization of the households in the survey zone allowed me to hypothesize the interaction between districts, as well as to assess whether population nucleation was playing an important roles in the evolution of leadership in the region.

5.3.1 Regional Population Distribution

The absolute population of each supra-local community or district (Figure 5-11, Figure 5-12) was obtained using their respective boundary polygons as masks to extract the cell values from a raster file⁹. This is used to compare the size of each demographic district or supralocal community and its potential for the exercise dominance at regional scale.

For the Period I the 95% of the households were organized in two supra-local communities or districts. The largest one, SLC 101, with 1358 people or the equivalent of about 270 households¹⁰, includes 87% of the population of the survey zone, and it may have exercise a clear dominance in the region. Just the central cluster or peak alone have around 391 people (~78 households), which correspond to 29% of the district and 25% of the total population of the region. The second one, SLC 102, may have included only 123 people (~25 households) and it may have been just a satellite settlement – village- of the largest one. The rest of the population, around 75 people (~75 households) were living scattered in isolated houses or small hamlets in the rest of the survey zone.

During Period II, population experienced a seven fold increase, and the majority (95%) of the total population were organized in supra-local communities or districts. The largest one, SLC 201, includes 610 households (3050 people), almost two times the total population in the survey zone during the previous period, but only 29% of the Period II total. Its immediate three neighboring districts, despite having less population individually, have altogether almost the same population: 3089 people or around 620 households. This indicates that any attempt to exercise dominance by demographic scale must have required the formation of political alliance between two or more districts.

⁹ ESRI ArcMap 10.1 was used for this analysis.

¹⁰ It is assumed that an average family was integrated by 5 people. This assumption is used during the rest of the present dissertation.



Figure 5-11 Absolute average population estimates by districts by period.

The delimitation of districts for Period II created one small district, SLC 209 with only 129 people, or 25 households. It is difficult to think which kind of unit larger than a village it could be. This district is an artificial product of the analysis and delimitation explained above. The districts or supra-local communities were defined without really knowing the scale of the population inside each one, and

considering only the tridimensional patterns emerging from the integration of spatial and surface artifact densities. In consequence, in the following analyses this should be kept in mind when comparing with more populous districts of the same period.

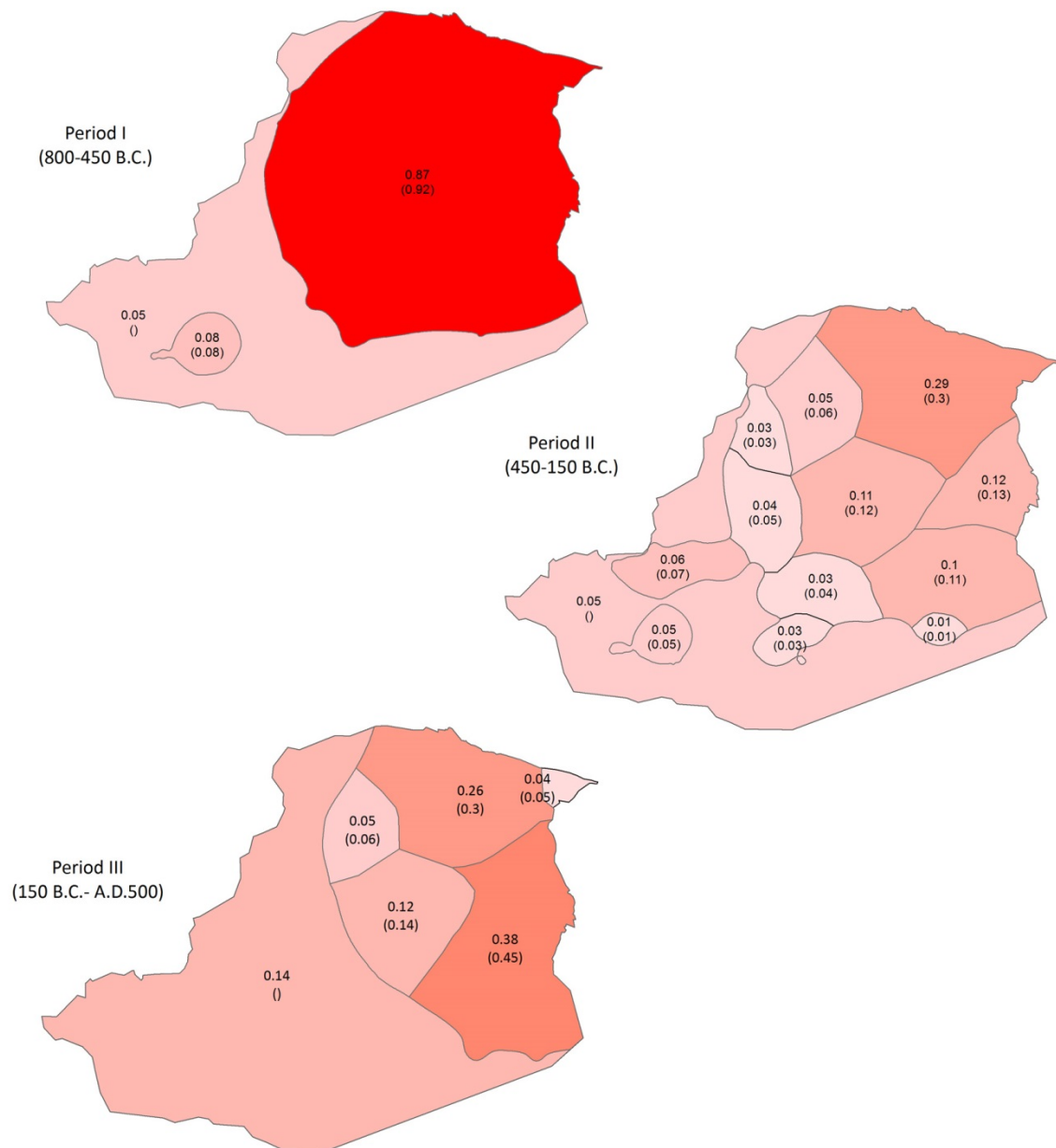


Figure 5-12 Regional demographic distribution as a share of the total survey area population. Numbers between parentheses represent the share if only the population organized in supra-local communities or districts are considered.

During Period III, population dramatically decreased to almost one seventh of the total from the previous period, and households were concentrated mainly in the eastern half of the survey zone. During this time, 44 households or 14% of the population were living in scattered dwellings or small hamlets distributed through the west half of the survey zone and no organized in larger scale political units. Two districts, SLC 302 and SLC 305, with 79 and 117 households respectively, concentrated 64% of the population, but similarly to the Period II, no district could have enough population exercise alone demographic dominance in the survey zone. Two districts, SLC 301 and 303, are very small, and they must correspond to a small village in the periphery of the largest districts and this fact should be taken into consideration when compared with the other larger districts.

5.3.2 Demographic Centralization

Measurements of demographic centralization have been used to determine the formation of central places as one important factor in the consolidation of supra-local community integration (Drennan and Peterson 2012). One common tool have been the analysis of site-size histograms in which outstanding settlements are identified (Kowalewski, et al. 1989; Liu 1996; Wilson 1988). However, concerns on the highly subjectivity of the identification of levels of differentiation or tiers, the effects of vagaries of sampling on the results, the significance of the departure from what is considered as an expected distribution, and how to measure the degrees of centralization for comparison between cases, have been raised (Drennan and Peterson 2008).

Another method, more suited for comparative purposes, have been the interpretation of rank-size graphs (Johnson 1980; Savage 1997). Despite new improvements in the tool by providing estimates of confidence and degrees of departure from normality have been made (Drennan and Peterson 2004), the tool still relies strongly in the identification of clearly defined occupational clusters -archaeological sites- or local communities, and there are cases in which local communities cannot be identified such as Alto Magdalena in Colombia (Peterson and Drennan 2005) or the present study case of the Middle Nepeña Valley. For this last reason, an alternative method has been suggested.

Drennan and Peterson (2008) presents a method to estimate both the degree of centralization and the confidence of the results that does not require the definition of sites or the existence of local communities. In each supra-local community or district, the highest demographic peak was identified and from there twelve rings of similar area were drawn (Figure 5-13). The sum of the DAI/century values for each ring was extracted from a grid with 10 m resolution cells of each period. This information was used

to determine the proportion of population in each ring and the 90% error range using the number of households in the region as the sample size (Drennan 2009:140).

In addition, a centralization degree index, the B-value, was created in order to measure the degree in which population are concentrated in and around the demographic centers (Drennan and Peterson 2008). If the population was more or less evenly distributed in the landscape, each ring would have similar proportions and the generated B-value will approximate to zero. If, in contrast, people tend to concentrate in the demographic center (no necessarily the geometric center of the polygon of the district), the B-value would have a value close to 1¹¹.

The Figure 5-14 presents the results of the distribution of the population by ring in each district and in the survey area as a region, and the Figure 5-15 shows maps with the B-values for each district by period. During Period I, despite a majority of the population was integrated in SLC 101 with a clear central place, it has a low demographic centralization index ($B=0.228$), because many households were also settled in smaller clusters located between 2.5 and 3.5 km toward the edge (See Figure 5-5). These secondary clusters were the origins of many of the Period II districts. In contrast, the satellite community of SLC 102 have a moderate centralization ($B=0.622$), and it was characterized by the presence of a smaller secondary cluster – a small homestead- located approximately one kilometer to the west.

The districts of Period II show a great variability of demographic centralization. SLC 205 show the highest centralization with $B=0.865$, while SLC 210 have a negative index of $B=-0.175$. The original methodology does not consider negative numbers for the B-value, but zero as the lowest index indicating even distribution of population in each ring. However, SLC 210, does have a demographic peak, but most of the population were found in the outer rings. It is very likely that SLC 210, despite of having a moderate population size, it does not represent a real supra-local community, but instead at least three towns of similar size located very close to each other without the clear dominance of one over the other.

With the exception of SLC 204, 205 and 206 which seems to be districts with a major town surrounded by scattered households, the other districts seems to be organized basically by a large town with between 52 and 78% of the population, a second one with little more than 10% of the population, and the rest of households are dispersed around. Even in SLC 201, which have several clusters of people, have these two major towns in Kushipampa and Huancarpón settlements respectively. The scale of the district affects how far this second cluster is located. In SLC 201, 208, 211 and 212, the second cluster is located between 1 and 1.6 km from the demographic center. In SLC 202, 203, 207 and 209, it is located

¹¹ The detailed explanation and formulas can be found in Drennan and Peterson (2008)

between 400 and 750 meters apart. While someone could argue that many of these clusters were visible in the surfaces (Figure 5-6) of Period I, because the population scale was small, these smaller peaks represent very likely the foundational household(s) and not a village or town.

Finally, during Period III, demographic centralization stabilize for all the districts between $B=0.704$ and $B=0.850$. The two major districts, SLC 302 and 305 followed the binary distribution of population observed in the previous period, while SLC 301 and 303 are demographically too small to think that there could be two major settlements. In contrast, SLC 304 as was its predecessor SLC 205, was basically a district with one settlement surrounded by scattered hamlets.

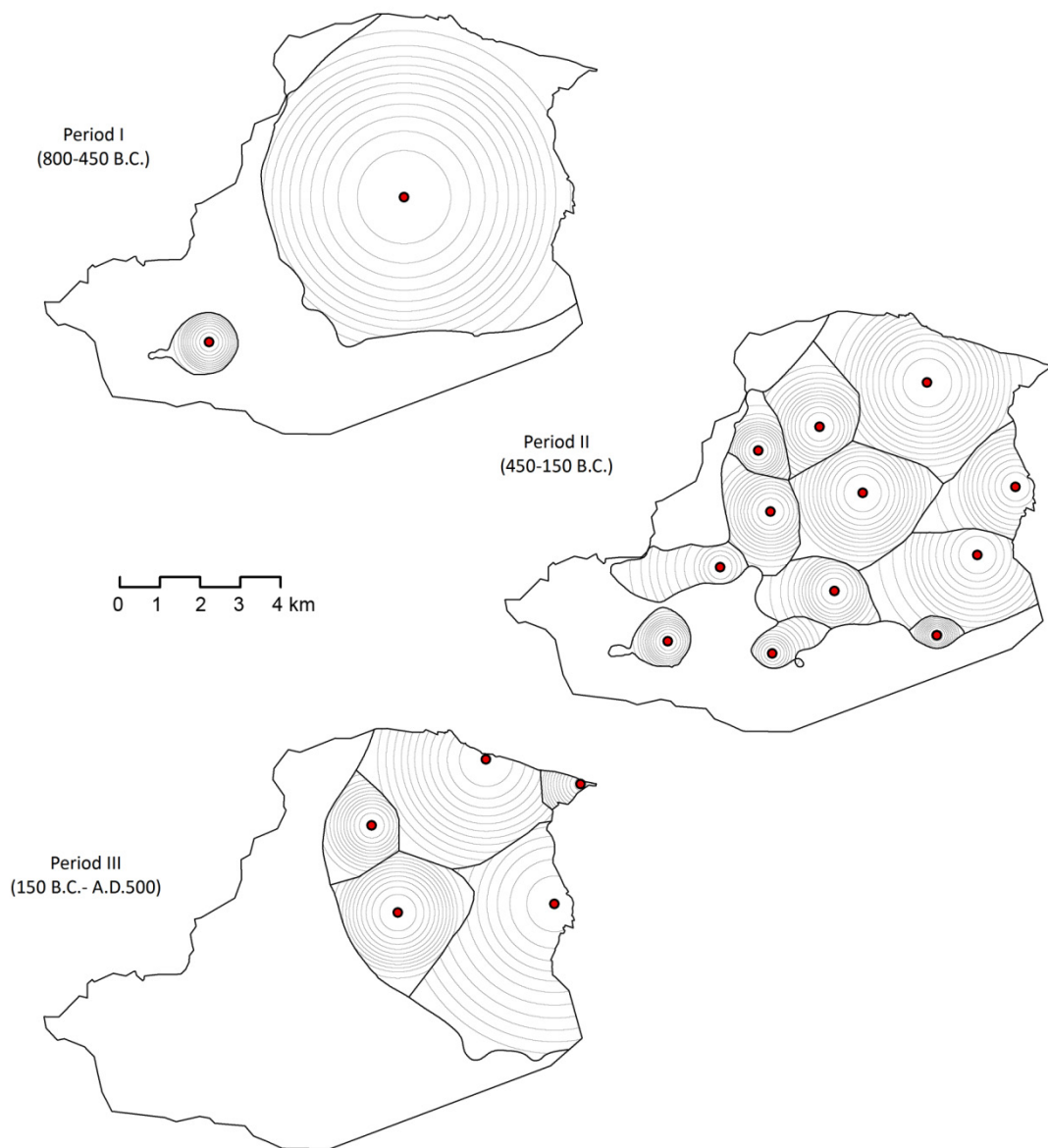


Figure 5-13 Districts with the twelve concentric rings with similar area used for the centralization analyses. The demographic center is indicated with a red dot.

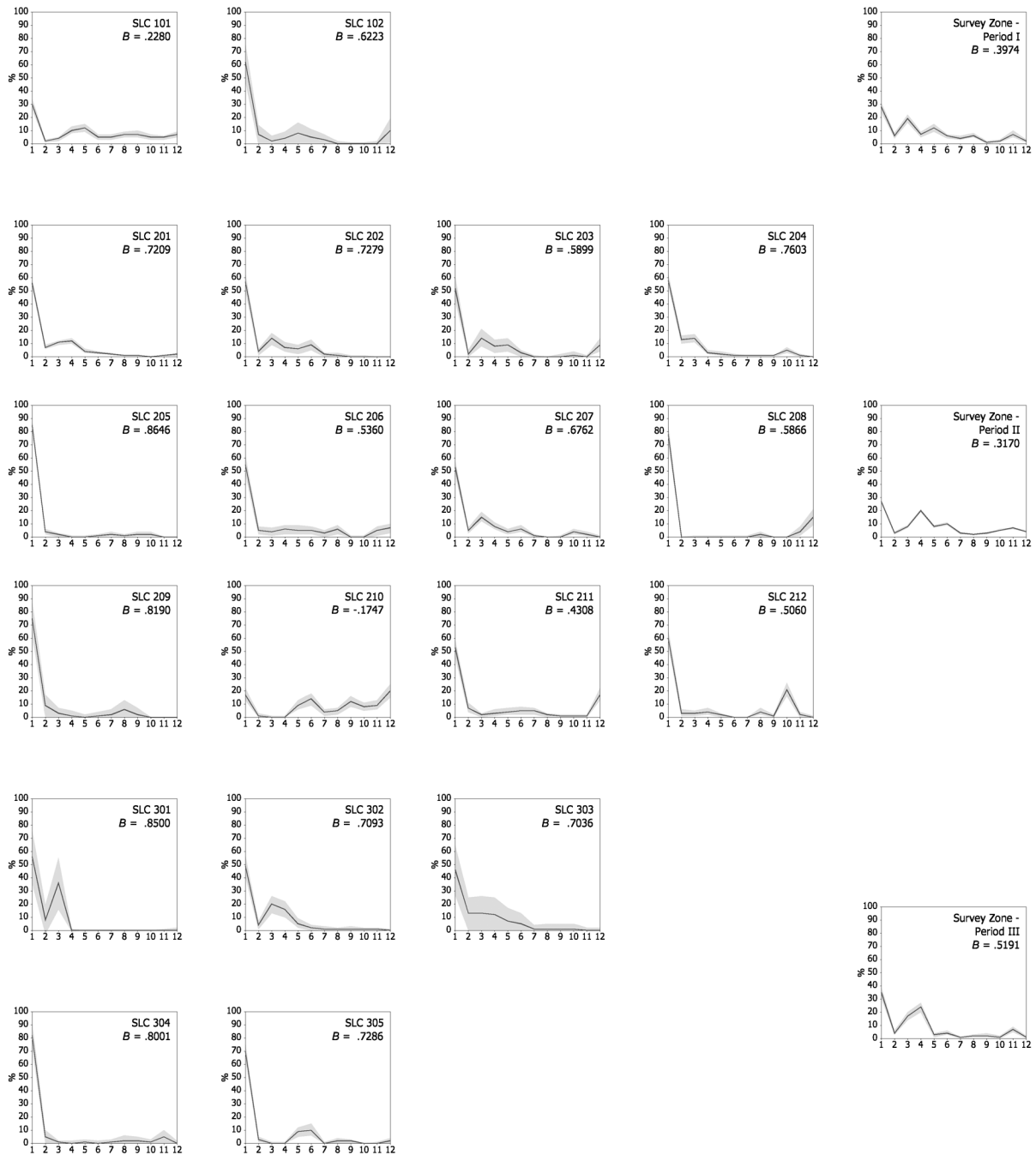


Figure 5-14 B-values and centralization graphs (dark line) with 90% of confidence zone (shaded area) for each supra-local community (SLC) or district by Period. The three graphs of the right show the same estimates for the whole survey zone by period.

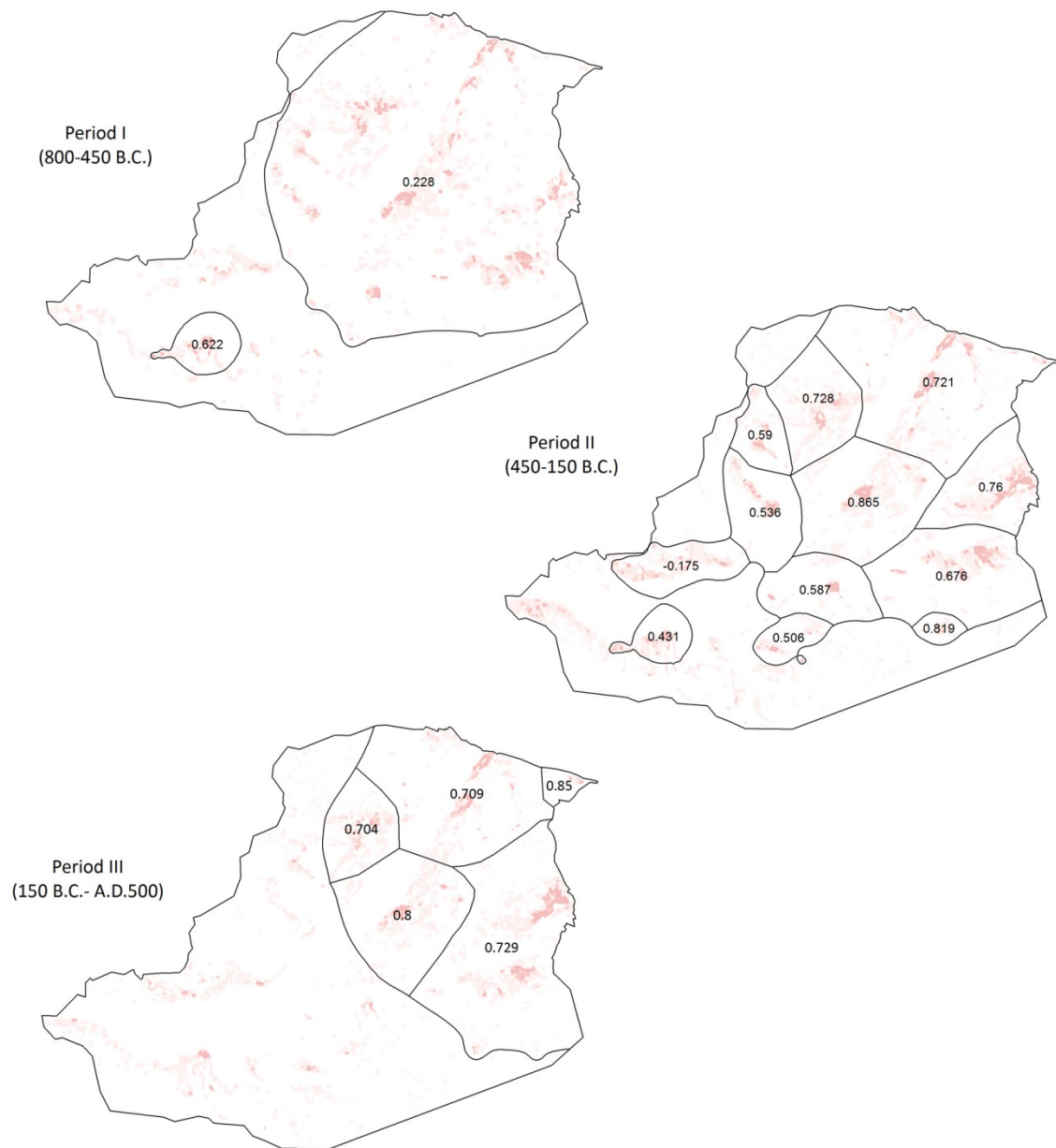


Figure 5-15 Demographic centralization expressed in B-values for each supra-local community or district by period. The intensity of red in the background indicates the relative density of occupation (10 m resolution).

5.4 LEADERS AND DEMOGRAPHIC PATTERNS

The moderate tendency of people to concentrate in certain areas in the survey zone has permitted to identify supra-local communities or districts. Are these concentrations related to leaders' location? Having people concentrated reduces the cost of interaction and communication for them, but also facilitates the potential control over them in hierarchical societies (Drennan and Peterson 2012).

In state societies the decentralization of population is related to the delegation of power and the formation of hierarchical political systems (Drennan and Peterson 2008), allowing secondary political centers to manage resources and labor. However, in rank societies, with less developed organizational system (i.e. bureaucracy) the location of households may shape the way authority and leadership are built in the communities (Beck 2003; Drennan and Peterson 2008). A disperse population would force leaders to create mechanisms to attract people and encourage them to accept their authority (Beck 2003); leaders may follow strategies that highlight the benefits of cooperation (Stanish 2004) and these group-oriented political economies limit the opportunities for leaders to show wealth and sharp inequalities (Blanton, et al. 1996; Renfrew 1973). Large scale ceremonies and public monuments are expected from this kind of political system. In contrast, limited mobility may encourage exploitation or the formation of political organization with top down delegation of power and clear signs of accumulation of wealth (Beck 2003; Gilman 2001). High degrees of inequality would materialize in the form of elite residential compounds, differential access to ritual, etc.

The correlation between demographic concentration and higher ranked households is considered in this section as a measure of the degree of potential control over people by leaders. The relationship between demographic patterns and leadership is analyzed by comparing the distribution of higher ranked households between and inside districts.

5.4.1 Leaders' Households Distribution

The assumption behind this analysis is that if the districts were politically autonomous and followed the same political "rules", every one of them must share a proportion of higher ranked households in line to their share of total population. I analyze the distribution of leaders in the survey area comparing the share of each districts from the estimated regional total (Figure 5-16), and comparing bullet graphs of

both proportions with error ranges obtained using the numbers of households (five people) in each district as the sample sizes (Figure 5-17).

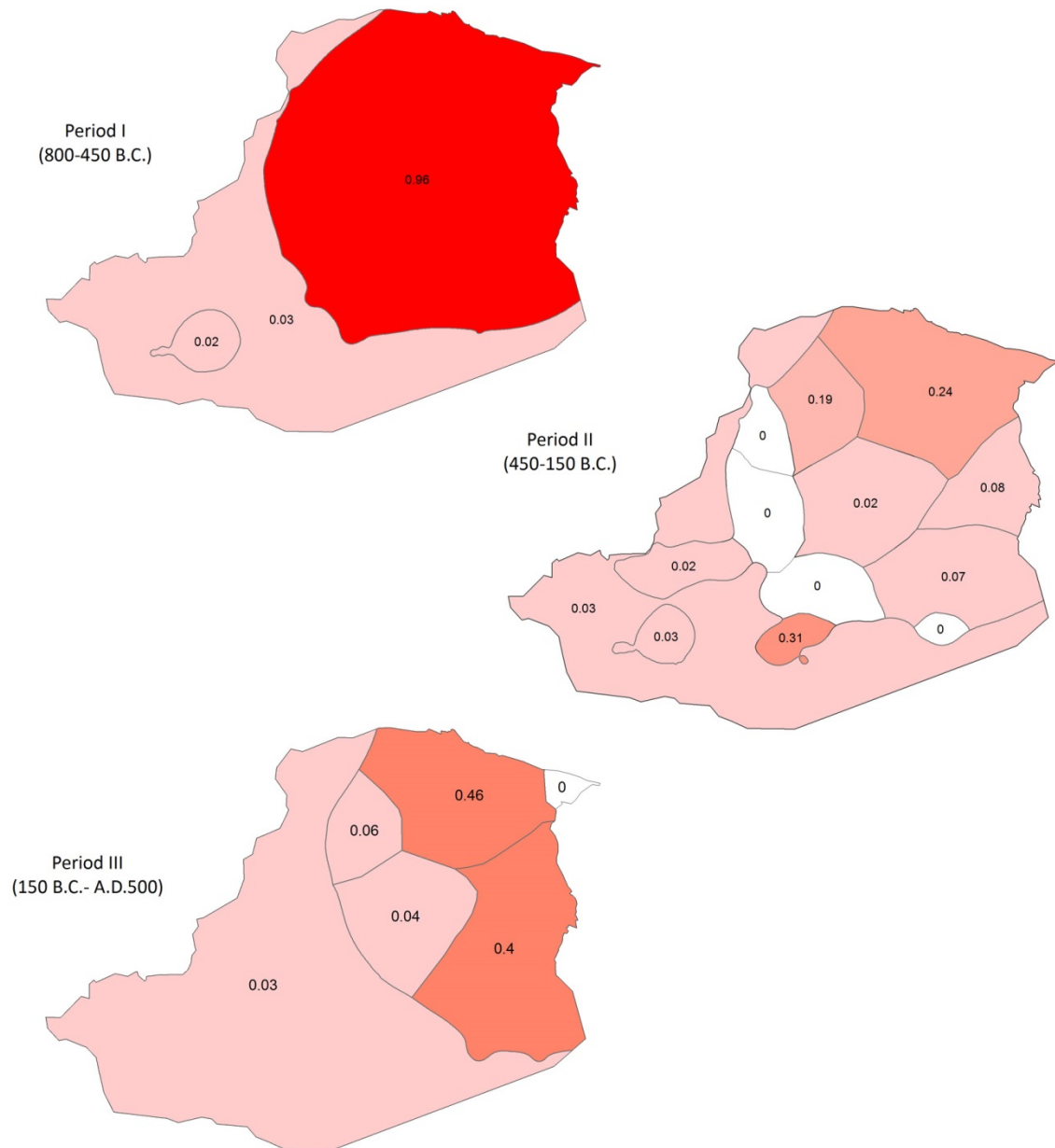


Figure 5-16 Distribution of higher ranked households between districts as a share of the total regional estimate.
Intensity of red reflects the share.

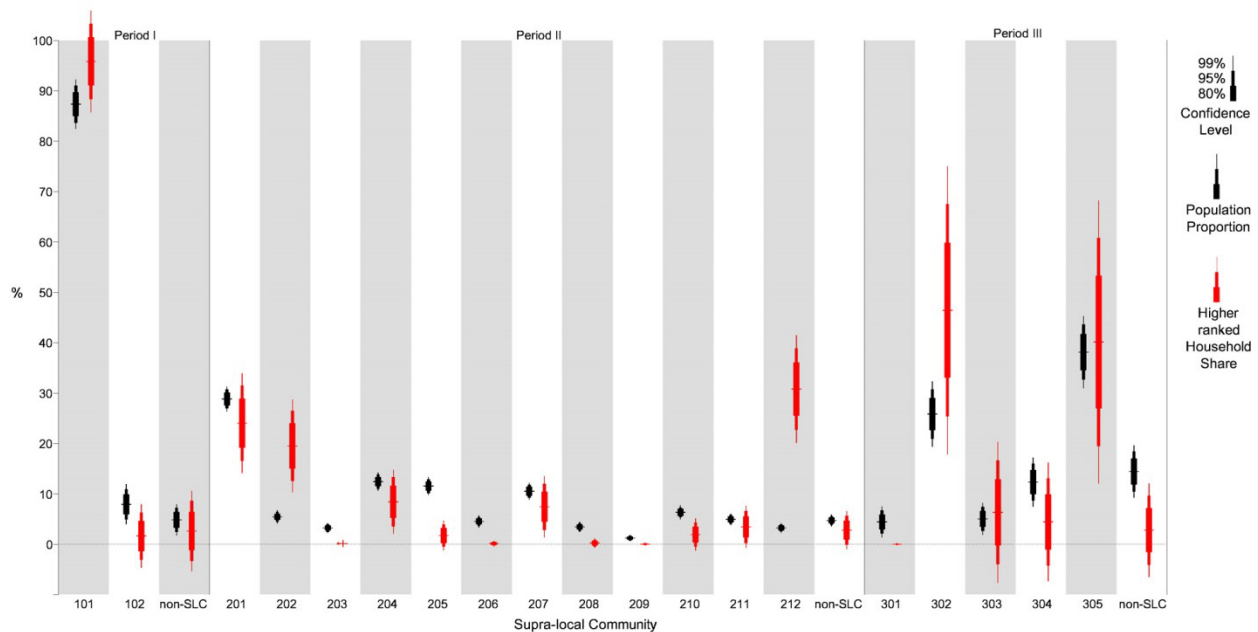


Figure 5-17 Comparison with bullet graphs between the districts' proportions of the total population and total number of higher ranked households (Rank 1-3) in the survey zone during Period I, II and III.

During Period I, the distribution of higher ranked household is roughly similar to the population share in each district. However, SLC 101, with its slightly higher-than-expected proportion, concentrated almost all the higher ranked families of the region.

During Period II, there is only a rough relationship between higher ranked households and the population share of each district. Districts such as SLC 202, 205 and 212 have disproportionate amounts of higher ranked families. Three districts together, SLC 201, 202 and 212, accumulate the majority (74%) of these affluent families, while SLC 205, formed from around the former demographic center of SLC 101, have much less than expected. Moreover, others districts such as SLC 203, 206, 208 and 209 almost lack of them. This irregular distribution of higher ranked households suggests that, during this period, the political activity -related to the presence of leaders- was carried out more intensively in some districts than in others. This is also indicates that the demographic districts are not necessarily political units, because while some districts lack of clear evidence of such authorities, others have much more than it could be expected from their population size.

During Period III, the most populous districts, SLC 302 and 305, have higher than expected number of higher ranked families, comprising the majority of them (87%) from the survey zone total. In other districts and the zone outside them local leadership existed, but they were limited in number.

5.4.2 Leaders' Households Centralization

The previous analysis provides as a general picture of the distribution of leaders in the survey zone, but it does not tell us how leaders located themselves inside the community. It is possible that higher ranked households represent a natural development of population aggregation, and consequently, its distribution could parallel those of the overall population. In consequence, if the twelve rings generated from the demographic centers are used in each district to evaluate higher ranked households' distribution, it is expected not only similar B-values but similar distribution profiles.

If being closer to as many people as possible was important, as for instance to gather labor, then the frequency of higher ranked households must be higher near the demographic center (or the inner rings) than far from it. Using the same twelve rings of the previous analysis to compare the distribution of higher ranked households will provide B-values with higher values than those obtained for the overall population distribution. In contrast, if leaders preferred to settle apart from the dense settlements, their distributional profiles will differ markedly and their B-values should be lower.

This comparison and analysis of the distribution of higher ranked households (Figure 5-18) was carried out for all the districts in the three periods and the results are shown in Figure 5-19 and Figure 5-20. For Period I, the distribution of higher ranked households in the whole region correlates roughly with the overall demographic distribution. However, the internal correspondence is only strong for SLC 101, being most of the affluent households, especially those "long-term", in, or close to, the population clusters (Figure 5-18). "Short-term" higher ranked households, or those with average estimate population of less than 1 person by century, were located at the edges or outside these relative denser settlements. In SLC 102, one "long-term" higher ranked household were at the edge of the cluster that define the demographic center, while a short-term one was located further away.

During Period II, the distribution of higher status households was even less centralized than the distribution of the total population at regional scale. However, at district scale, there is a marked variability in the way the distribution of affluent households correlate with the total population distribution.

In few districts, such as SLC 201, SLC 204, and in some way SLC 207 and SLC 212, it is observed similar or higher-than-expected degrees of higher status households' centralization indexes in comparison with the total population distribution. In the other districts, there is a tendency of higher ranked households is to settle apart or at the edges from the demographic centers. Indeed, at least in SLC 202, 203 and 211, these affluent families were living in the second largest population cluster, while in the

rest they were distributed at the edges of the clusters or scattered around. Despite the described variability, “long-term” higher ranked households during Period II were located inside, or very close to, the demographic clusters as observed for Period I. In contrast, the “short-term” higher ranked families had a wider distribution and many of them were dispersed households.

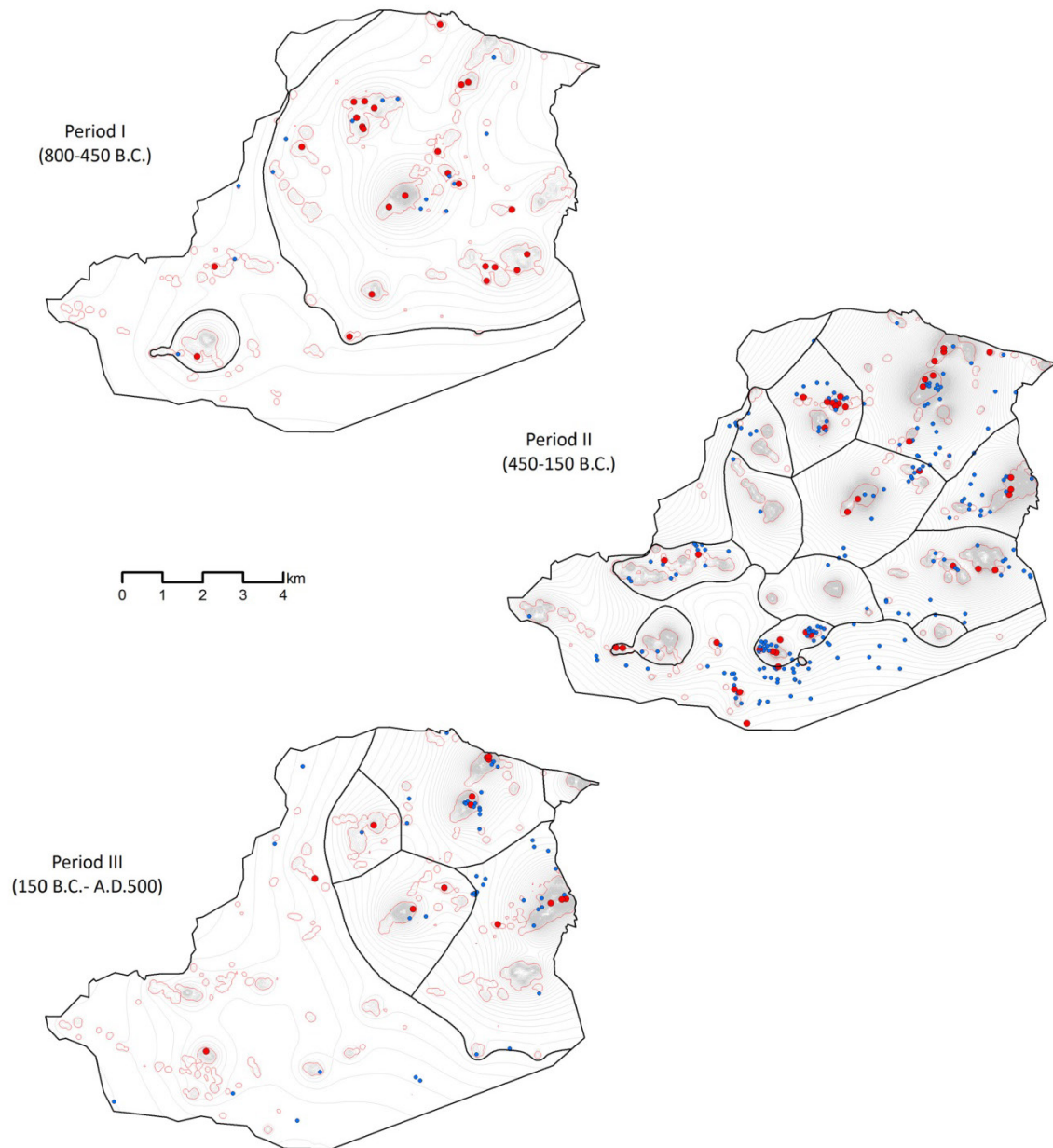


Figure 5-18 Location of short-term (blue dots) and long-term (red dots) higher ranked households in the survey zone by period. Contours show population density and red polygons represents population clusters.

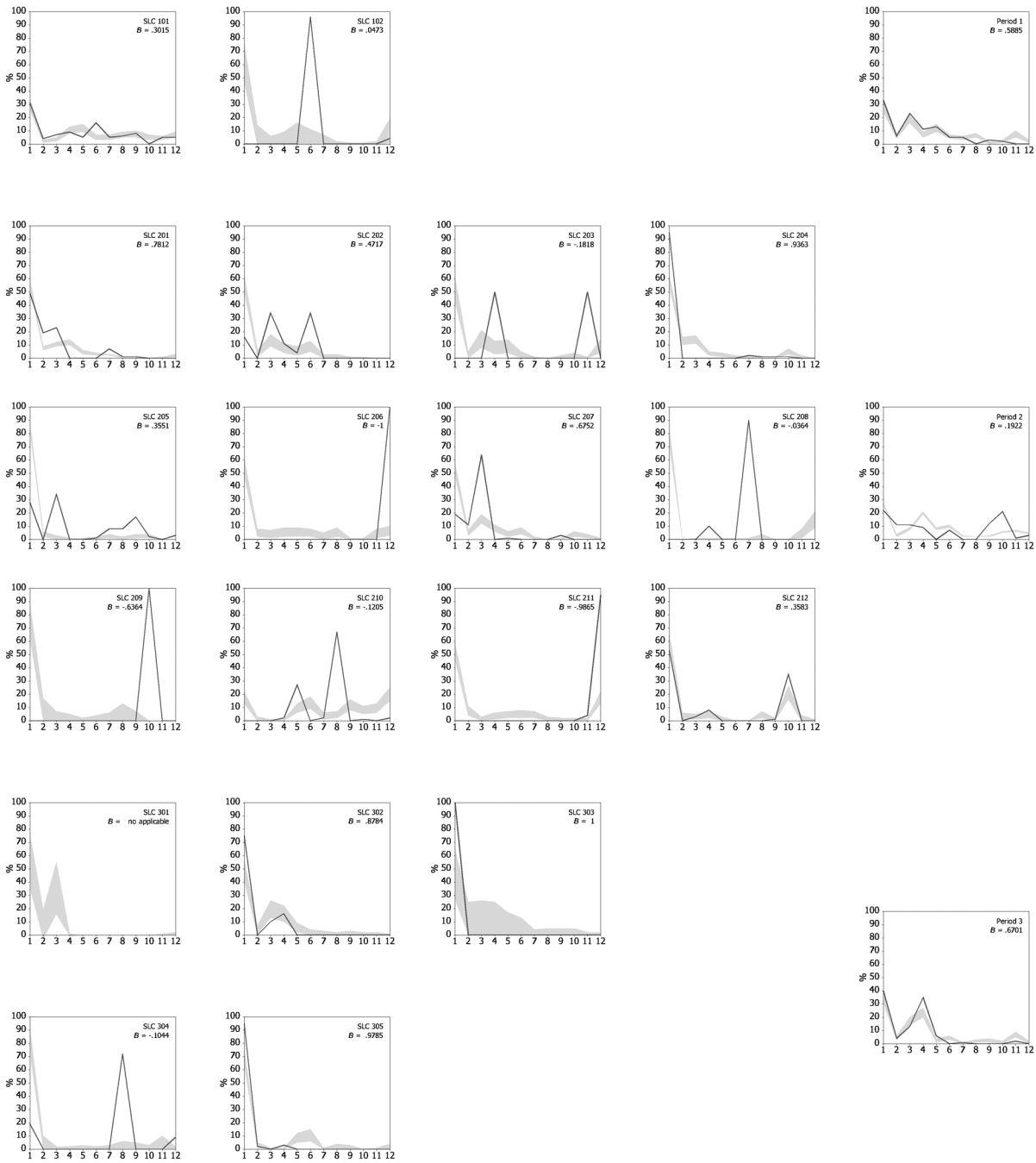


Figure 5-19 B-values and centralization graphs for the distribution of higher ranked households contrasted with the 90% confidence zone of population proportions (shaded area) for each supra-local community (SLC) or district by Period. The three graphs of the right show the same estimates for the whole survey zone by period.

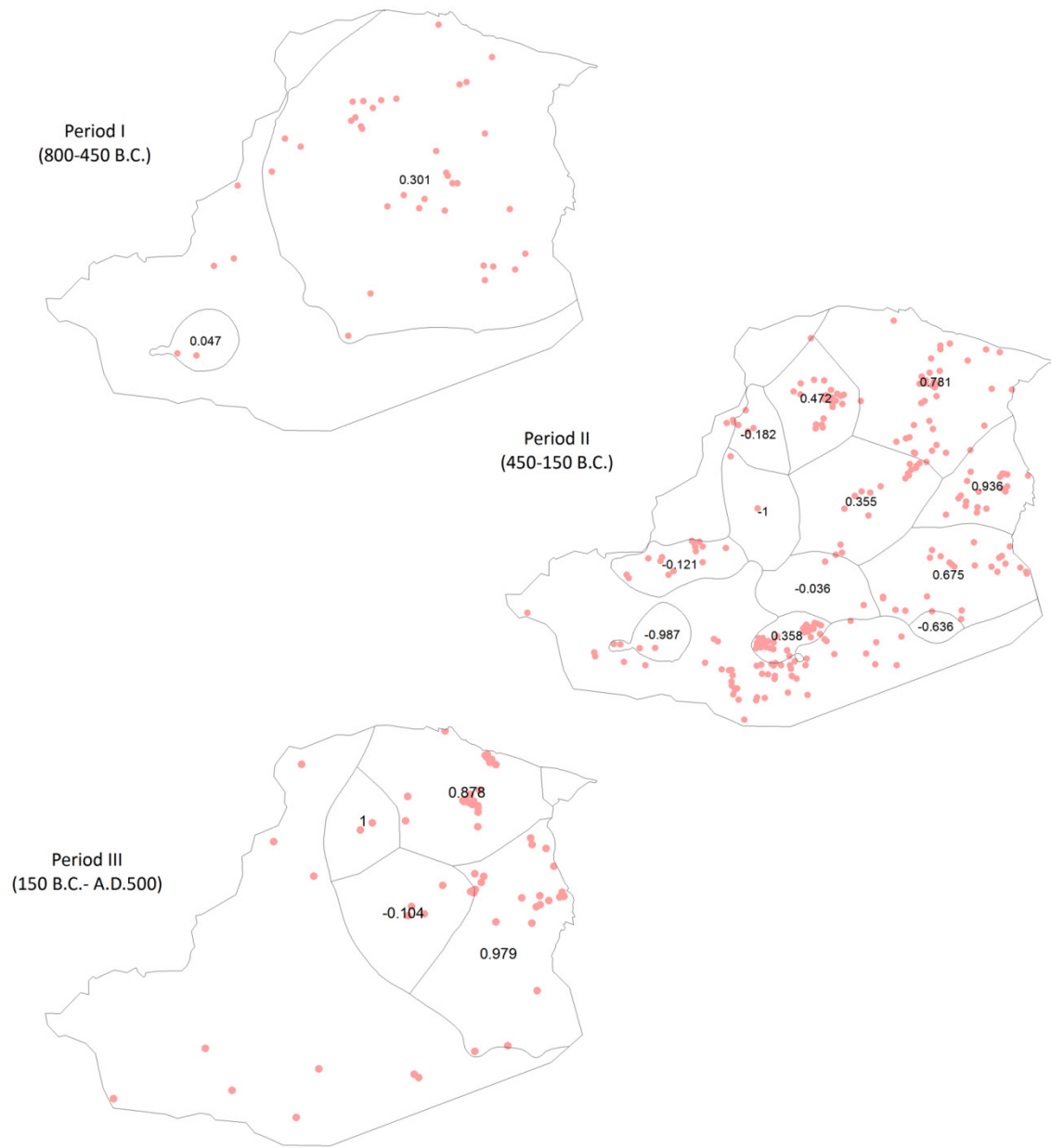


Figure 5-20 Map showing the location (red dots) and degrees of concentration around the districts' demographic centers (B-values) of higher ranked households (red dots).

During Period III, the distribution of higher-ranked households followed closely the overall distribution of households at regional scale, having a centralization index markedly higher in comparison with the previous period. Two districts, SLC 302 and 305, concentrated the large majority of higher ranked families, and they were highly concentrated in the demographic centers. A third district, SLC 303 followed the same distributional pattern, while SLC 304, with a very small presence of affluent families,

was the only with a contrasting distribution. Following the tendency of the previous periods, “long-term” higher ranked households were mainly living in or close to the demographic centers. The “short-term” ones were more dispersed, but concentrated mainly in SLC 302 and 305, and considering the whole survey zone, they were relatively close to the major demographic and political central place of the region.

5.5 SUMMARY AND INTERPRETATIONS

The Middle Nepeña Valley had a remarkably dynamic demographic history between 800 B.C. and A.D. 500 (See Figure 5-21). By the Late Formative Period (Period I), the survey zone was inhabited by 1200-1900 people, most of whom were part of a single, large supra-local community. A smaller satellite community was located to the its west, separated by two kilometers virtually devoid of occupation. The large supra-local community had a clear central cluster of households surrounded by secondary clusters of population in a 1.5 to 2 km hinterland. These secondary clusters as a whole encompassed most of the population in the supra-local community, resulting in a low demographic centralization index. During this period, one of every ten households, or an average of 30 households per century, were identified as higher ranked (leadership households) and these were only weakly concentrated in the demographic center of the large supra-local community. However, they were distributed in or very close to the demographic concentrations that were the seeds of the multiple districts that formed during the following period (Period II). Therefore, the overall regional picture is of a relatively well-integrated population (into a single dominant super-local community), moderately centralized demographically and politically, without highly centralized local leadership.

The Final Formative (Period II) saw a population explosion in the survey zone, with the population growing to 8500-12700 people. The region as a whole witnessed a slight reduction in their demographic centralization (from $B=0.397$ to $B=0.317$), yet most of the population were living in more demographically centralized districts (from an average for districts of $B=0.425$ to $B=0.587$). The second major change in Period II was the emergence of multiple districts or supra-local communities. From 500 B.C. on, the population was divided into 12 districts that varied in area, population size, and degree of centralization, among other things. Leaders were spread throughout the survey zone, and many of these Period II districts may have had their origins in the secondary and peripheral small population clusters of the previous period.

During this period, one of every 17 households, or an average of 127 households by century, were identified as higher ranked or leadership. The reduction of the proportion of higher ranked households, even while population skyrocketed, indicates that leaders potentially had larger pools of “followers,” or, to put in another way, higher ranking households interacted with a larger network of non-leadership households. There was no nucleation of leadership households. While some leaders were living close to the main population concentrations, other leaders were spatially removed, typically living in the second largest household clusters that characterized many of the districts. This pattern could suggest the formation of small leaders’ villages separated from the demographic centers, with implications for sociopolitical hierarchy within districts.

Finally, the early part of the Early Intermediate Period (Period III) saw a drastic drop in population, in fact, to a level similar to that of the Late Formative. During Period III, the region continued to be divided, now into 5 several supra-local communities or districts. From 150 B.C. on, regional population was strongly concentrated in the eastern part of the survey area, with the bulk of people part of two large districts. Consequently, as a whole, the regional degree of demographic centralization increased (to $B=.519$). These Period III districts followed high degrees of population centralization similar to those of Period II. For instance, standard deviation of B-values declined from Period II $\delta=0.273$, to Period III $\delta=0.06$ despite the reduction of the number of districts from 12 to 5 and the increase of the average value to $B=0.758$. The B-values between 0.7 and 0.8, which were already present in many districts of the previous period, seems to correspond to long-term stable configurations of settlement concentration in the region.

During this time, one household of every 12, or an average of 25 households per century, were identified as higher ranked/leadership households. The leaders of the two dominant districts were highly concentrated in the demographic centers. This represents a continuing trend, because the two Period II districts that preceded these in this section of the survey zone had displayed this tendency. This trend suggest that, in the long term, for this region, successful leadership strategies were those enacted in a context of interaction with a larger/denser surrounding population.

The relationship between the location of leadership households and the population clustering could be two-fold. Leaders could have emerged in denser settlements because the concentration of population facilitated the creation of wider social networks to obtain followers, form larger labor pools, and consequently allow the formation of larger political factions. It is also possible that people were attracted to leaders, because there were social and economic benefits to living in proximity to better off households. In the Middle Nepeña case, the hamlets where leaders were archaeologically visible during

Period I, evolved during Period II into important demographic clusters or even district centers. However, there were many other households clusters in Period II emerged in areas lacking evidence for leaders during the previous period. Too, new leaders were emerging in zones where no previous Period I leadership was noted. The common feature in all the situations is that “long-term” higher ranked households were emerging in areas of dense occupation, and this likely was an important factor in the development of social inequality and authority structures. This hypothesis is further supported by the Period III patterns, when “long-term” or stable leadership were detected only in the areas where dense settlement remained after the demographic collapse.

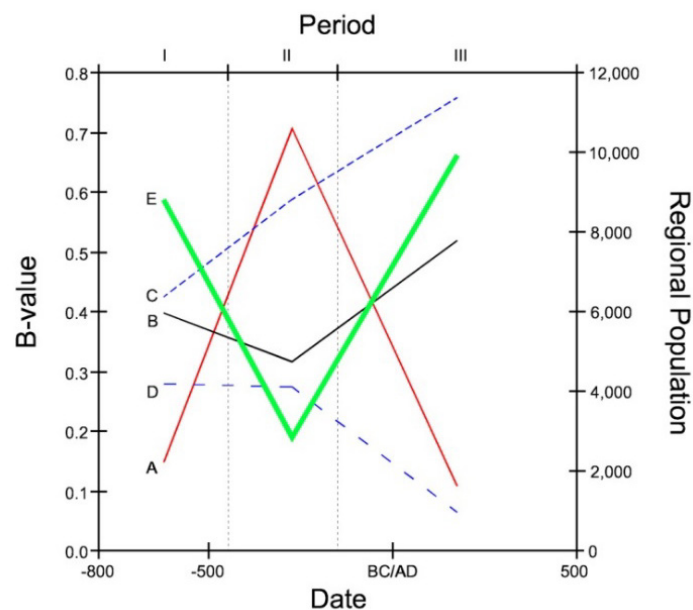


Figure 5-21 Summary graph of demographic tendencies by period: A) Absolute regional population size, B) B-value for the whole survey zone, C) average B-value of the districts per period, and D) standard deviation (δ) of B-values of the districts per period. E) summary B-value of higher ranked households for the whole survey zone.

In sum, there were great population changes between the end of the Formative Period and the beginning of the Early Intermediate Period (Figure 5-21). The disintegration of the Cupisnique-Chavín Religious Complex did not involve a demographic collapse. To the contrary, population surged in the following period, to a degree which could only represent intensive immigration to the Middle Valley. The greatly increased population was divided into a dozen demographic districts or supra-local communities, differing from one another in scale, degree of demographic centralization, and location of higher ranking (leadership) houses - - a fragmented social landscape. After a few centuries, population declined as rapidly as it had grown, and the population concentrated in two large districts in the eastern half of the

survey area. Although my research had originated to investigate the putative ideological – political crisis represented by the decline of the Cupisnique-Chavín Religious Complex, the survey revealed two demographic processes - - the massive population increase of roughly 700% in just a few centuries, and the subsequent decline of the same - - that, in and of themselves, could be seen as “crises.”

6.0 PATTERNS OF COMMUNITY ECONOMIC ORGANIZATION

6.1 CRAFT PRODUCTION DIFFERENTIATION

Differences in household production play a major role in community integration because these differing household economic emphases are part of economic interdependence among households. These economic specializations can create opportunities for wealth accumulation, and leveraging control over particular resources and goods in the formation of inequality and power (Earle 1997, 2002; Langebaek 1991; Welch 1996). In the next section, I will describe the productive differentiation within and among the supra-local communities and districts.

Households carry out multiple tasks during their lifecycles, and these can be very resilient to external sociopolitical changes (Bermann 1993; Cutright 2009). However, not every task is visible in the archaeological record, even with the implementation of intensive techniques of data collection (i.e. excavation). For my survey zone, I found that the only form of craft production that could be meaningfully addressed with the surface materials was ceramic production, represented by reused sherd scrapers, a tool for pottery making (see Chapter 3.0).

In assessing the intensity of ceramic production, I assumed that other things being equal, the amount of sherd scrapers is related to the frequency and scale of ceramic production. Because larger households could leave more remains than smaller ones, despite the lower frequency of the activity of the former, the total number of sherds in each collection was used to minimize this bias. The ratio of the density of sherd scrapers versus the total density of sherds is used as a proxy for ceramic production intensity. I do not attempt to approximate the absolute frequency and scale of the production of each household (Costin 1991; Costin and Hagstrum 1995), but instead worked with the relative intensity of this activity by households/groups of households in the region by period.

With this approximation I am not interested if a household engaged in small-scale craft production once in their lifecycle, but if a household or groups of households consistently engaged in such activity either in a very large scale in low frequency or in a moderate scale and high frequency during

generations. In the first, economic specialization could be the result from economic processes related to the growth and expansion as part of the household cycle (Hirth 2009; Santley 1993), while in the second and third scenarios, craft production resulted from patterns of economic relationships at local and supra-local community scales (Martin 2009; Spielmann 2002; Stanish 2004).

6.1.1 Ceramic Production Distribution

Assuming that every household and district in the region had similar rate of consumption and discard of pottery, for a regional landscape of economically autonomous districts we would expect a high correspondence between the abundance of pottery production artifacts and population size. If the case is otherwise, it indicates that some households and districts produced proportionally more pottery, and other districts proportionally less. This latter situation suggests a system of economic interdependence with supplier districts or “exporters”, and consumer districts or “importers”. In order to compare the distribution of pottery production in the region, I examined the distribution of scrapers among districts was required.

The frequency of reused-sherd scrapers from different collections cannot be directly compared because they were obtained with sampling units of different dimensions representing survey units of different sizes. The ratio of reused-sherd scrapers to the total number of sherds by collection was multiply by the density of surface artifacts to estimate the density of sherd scrapers in each survey unit. Survey units’ polygons were rasterized in a grid of 10 m resolution in which z-value correspond to the obtained density. Because every cell have the same size (100 m²) sherd scraper surface densities can be used as the relative index for the subsequent comparative analysis of ceramic production.

Using the polygons defined by the districts’ boundaries as masks, the sum of the values of densities of sherd scrapers were extracted from the 10 m resolution raster and the proportions from the regional total obtained (Figure 6-1). In order to obtain error ranges for the bullet graphs (Figure 6-2), the sample size was as the number of scrapers based on the estimated total number of scraper fragments in the survey zone¹².

¹² I assumed that each fragment may be one third of the whole tool. It was very difficult to determine the real size of each specimen because these scrapers are products of expedient manufacture which size and shape are constrained by the original sherd. If the ratio is incorrect, and the sample size changes, it will affect only the error ranges of the estimates, while the relative proportion between cases remaining similar (Drennan 2009)

During the Period I, both districts manufactured highly disproportionate amounts of pottery considering their respective population. SLC 102, with only 8% of the population produced almost half of the pottery of the survey zone. If ratios of consumption were similar, and most of the pottery was used in the area, this suggest that SLC 102 was a more specialized district, and very likely provisioning the larger SLC 101.

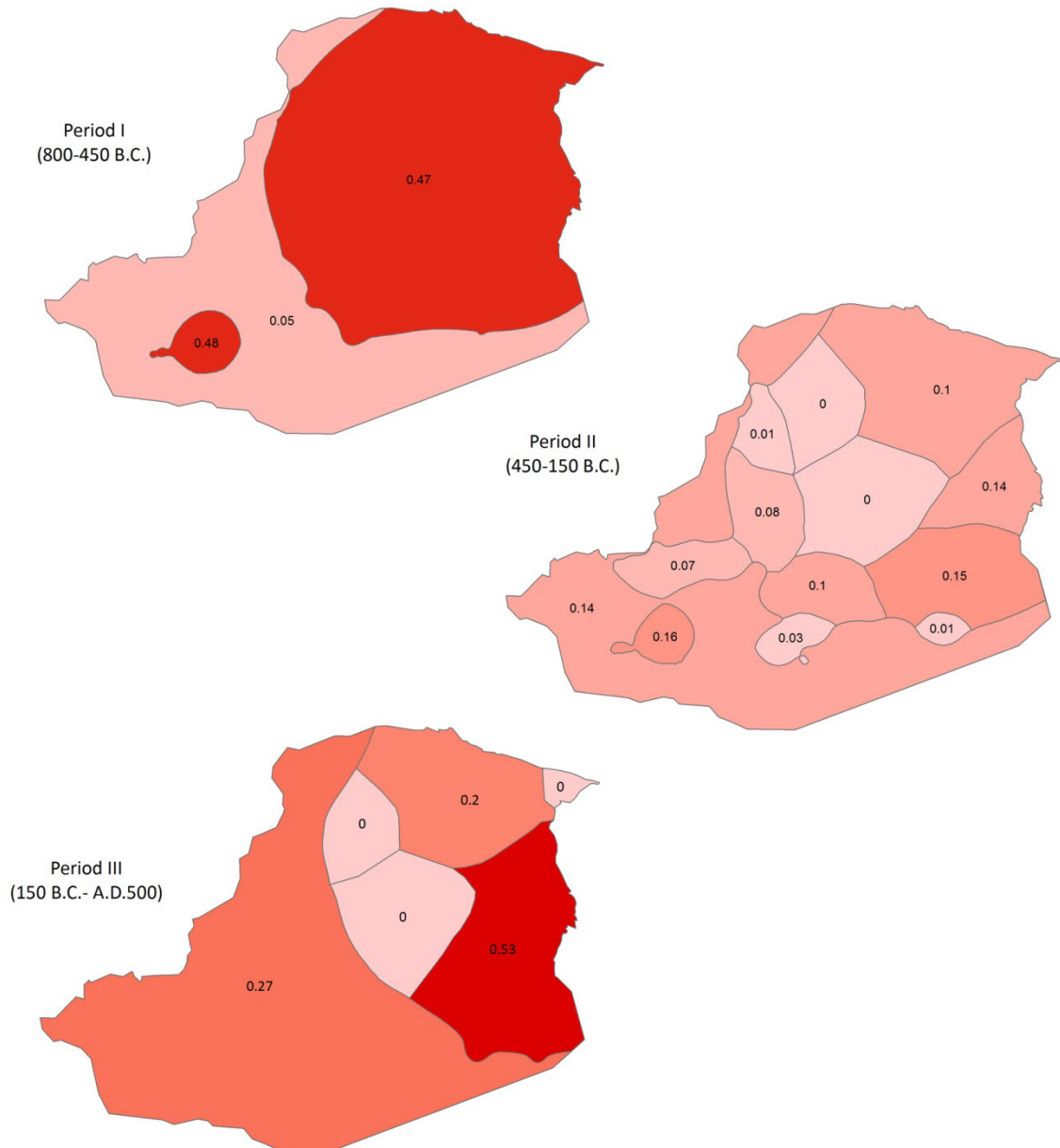


Figure 6-1 Regional distribution of ceramic production based on their share from the total amount of sherd scrapers, used as proxy, estimated in the survey area.

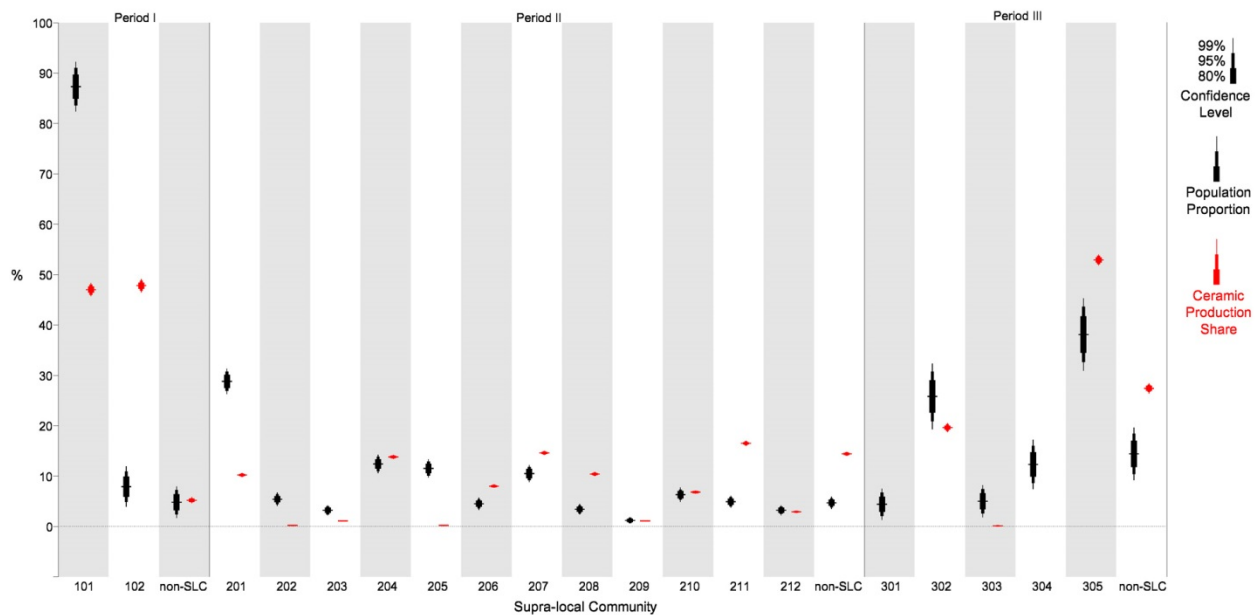


Figure 6-2 Comparison with bullet graphs of the demographic and ceramic production proportions for each supra-local community during Period I, II and III. Population sample is the number of households in the survey zone, while the ceramic production proxy sample size was calculated as the estimated total number of sherds of scrapers divided by 3.

During Period II, seven districts shared between 7 to 16% of the production, with four of them produces 1 % or less. The difference between the expected and the observed share, based on population, is in many cases strong and highly significant (Figure 6-2). No district had a strong dominance over ceramic production at a regional scale, but some of them were dependent on the production from others for their provisioning. It is notable that a significant amount of pottery (around 14%) was manufactured by hinterland households outside the districts.

The district labelled as SLC 101 in the previous period continued have a production deficit, and the excess of production from the western Valley, especially from the producers of SLC 211 and those outside the districts, must have been required to balance regional ceramic consumption (Figure 6-3). These results suggest the existence of an economic system integrating households of different districts, especially SLC 201, 202, 203 and 205, “the deficient core”, with their surrounding “industrious” neighbors.

During Period III, ceramic production was concentrated in districts SLC 302 (20%), 305 (54%) and in the hinterland households living outside the districts in the western half of the survey zone (27%). The

other districts were producing negligible amounts of pottery, and they must have been dependent on the production of others.

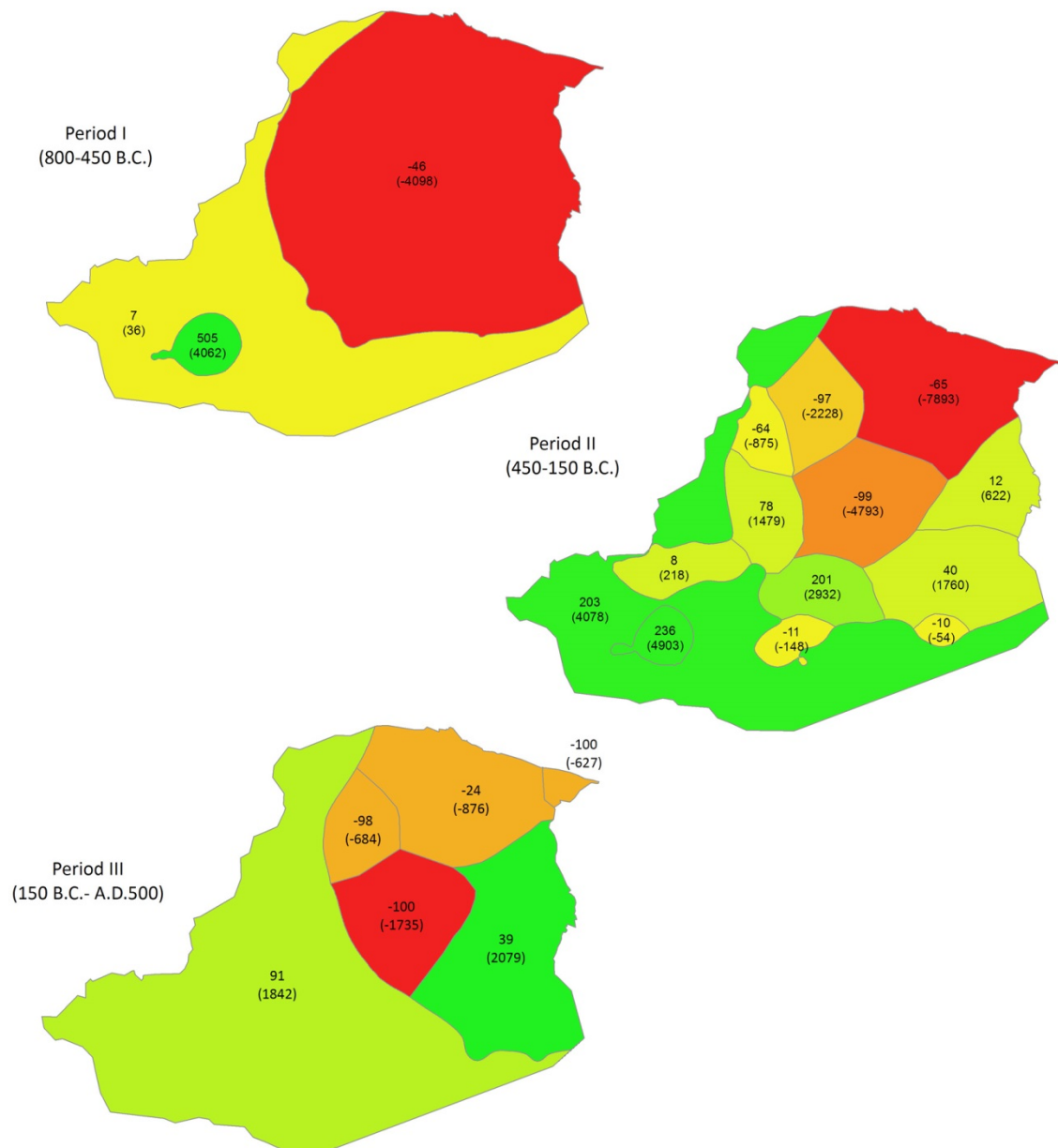


Figure 6-3 Differences as percentages between estimated total reused sherd scrapers by district and the expectation based in their population. Numbers between parentheses indicate the difference as the estimated absolute number of reused sherd scrapers in excess or missing by district.

6.1.2 Ceramic Production Concentration

As explained earlier, the expectation is that if ceramic production distribution was homogeneous inside districts, it should parallel population density distribution inside the unit. This comparison is carried out by analyzing the correspondence of ceramic production with the distribution of the population in each district using the demographic centralization rings, and then comparing the B-values, the centralization graphs and the maps of distributions (Figure 6-4, Figure 6-5).

During Period I, the distribution of pottery production in the region as a whole displays little correspondence to population distribution because of the relatively high specialization of SLC 102 community. In the SLC 101 district, pottery was mostly manufactured by households clusters in the periphery of the demographic center ($B = -0.482$), in SLC 102 pottery was manufactured exclusively at the demographic center ($B = 1.000$).

During Period II, the distribution of pottery production at regional scale better corresponds to the overall population distribution, and with a more even distribution than the in Period I. However, the distribution of this activity in the districts had a wide range of variation (B values from -0.65 for SLC 210 to 1 for SLC 208). All the districts producing less than 5% of the regional total have B-values higher than 0.5, which suggests that concentrate of production in the demographic center was more likely when the total production was relatively small. Districts with more than 5%, with the exception of SLC 204 and 208, have only moderate, low or negative B-values. In those cases, a large portion of the ceramic production was carried out relatively far from the demographic centers.

The disproportions observed for the Period II districts, reveals economic interdependence in ceramic production/distribution in the survey zone. In addition to the existence of a supply system that transcended district boundaries, within each district, production was also uneven or “patchy.” The demographic centers of some districts, such as SLC 201, depended on the supply from both its own secondary household clusters, and probably that of other districts as well.

During Period III, most of the pottery in SLC 302 and 305 was manufactured at or near the demographic centers. This activity seems to be very concentrated, but it is reflecting in part the way population was centralized in both districts. There is no disproportionate production relative to population. A third district, SLC 303, seems to have had production concentrated in a hamlet at the edge of the district. However, the production of this district is very low (nearly zero), and thus it should not affect our perception of the high correlation between population distribution and pottery manufacture during this period.

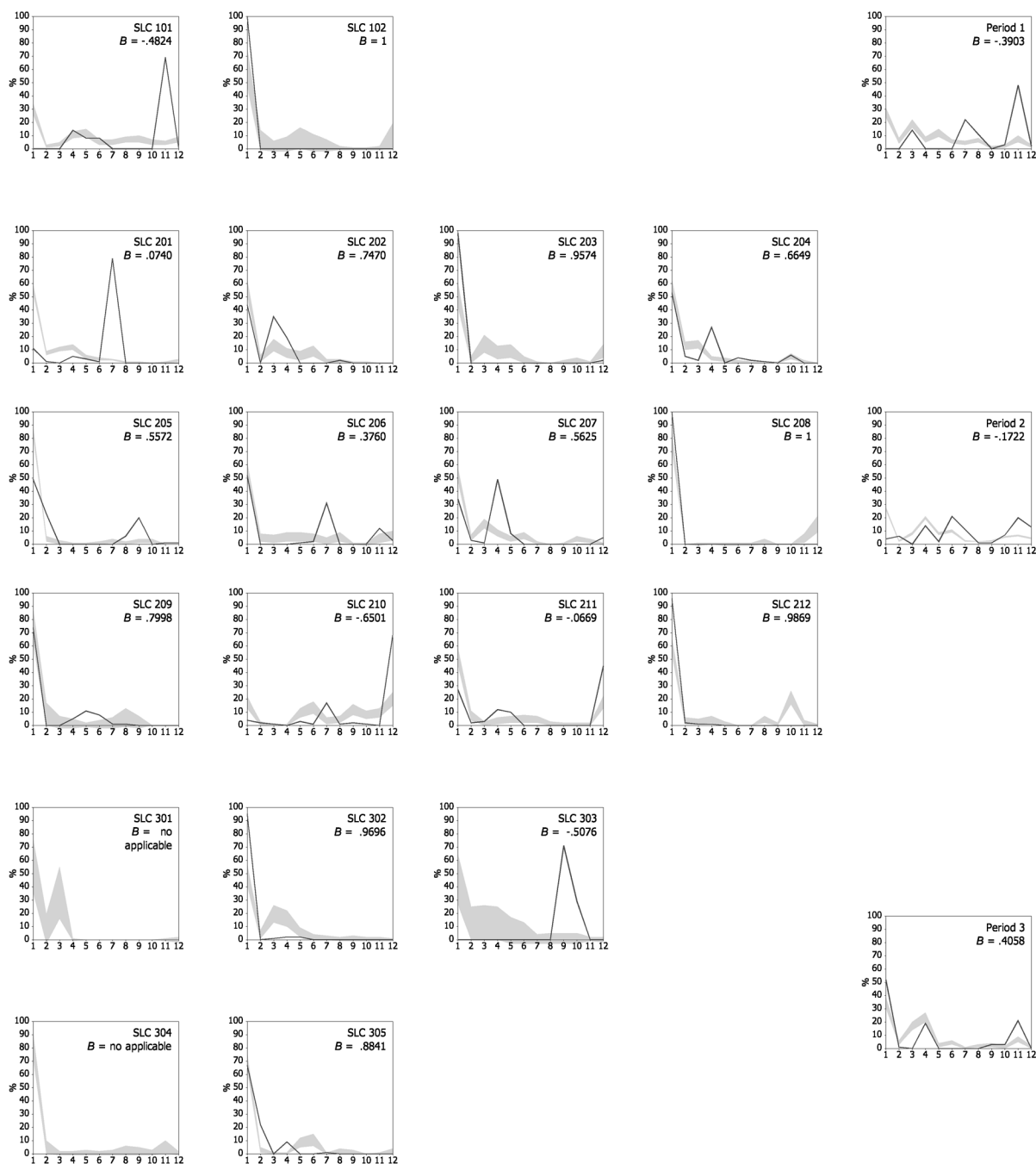


Figure 6-4 B-values and centralization graphs for ceramic production, based in sherd scraper distribution, contrasted with the 90% confidence zone of population proportions (shaded area) for each supra-local community (SLC) or district by Period. The three graphs of the right show the same estimates for the whole survey zone by period.

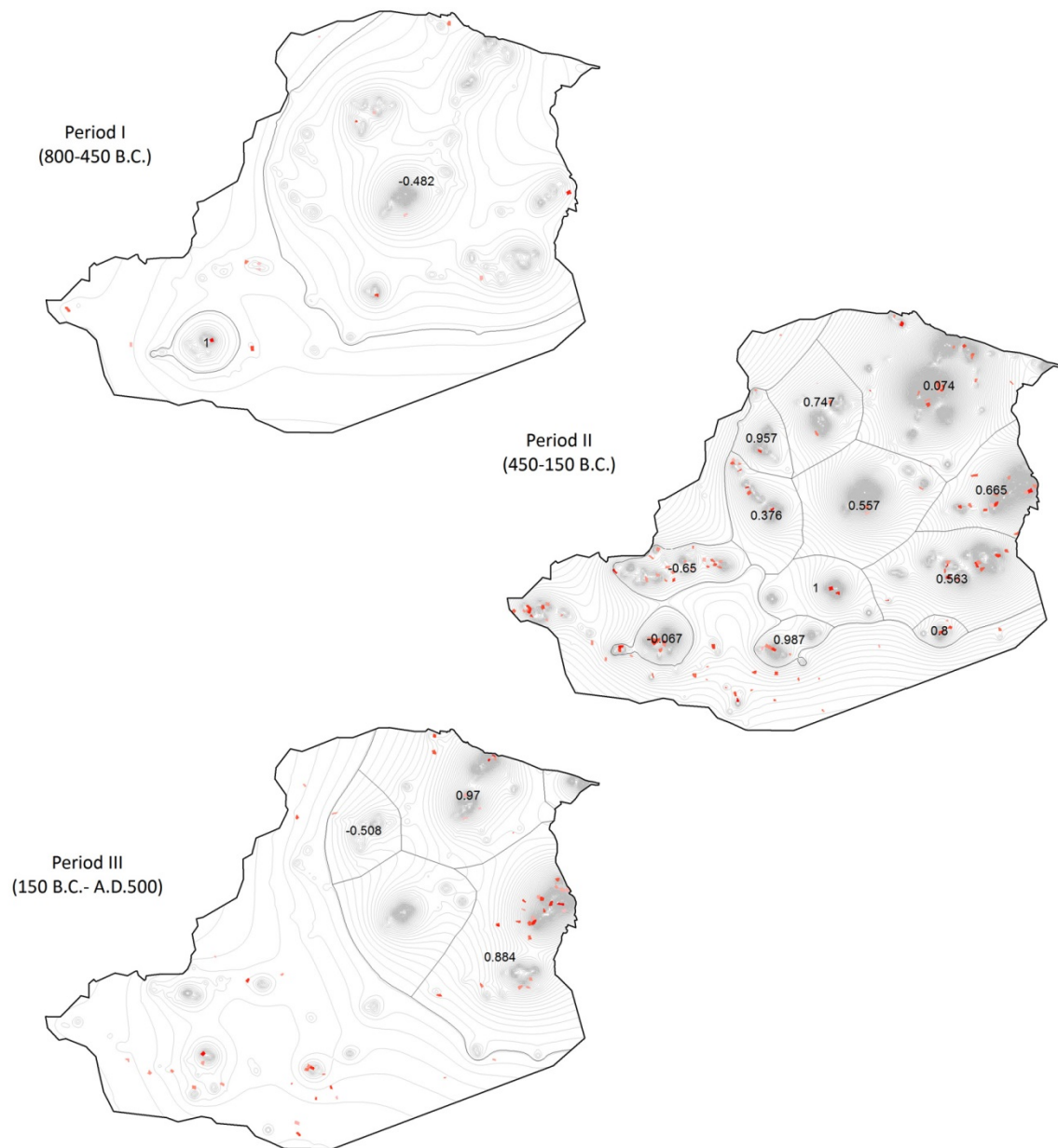


Figure 6-5 Map showing the degrees of concentration (B-values) of pottery production around the demographic centers in each district. Density of scrapers from a 10 m resolution raster (red) and population density (contour lines) are displayed for comparison.

6.1.3 Ceramic Production Intensity

For this analysis, the ratios between the density of scrapers and the total density of sherds were used as an indicator of the relative intensity of household pottery production. To minimize errors introduced by the existence of very small samples, the data on scrapers and total number of sherds, originally with a 10 m cell resolution, were aggregated into 100 m cell resolution raster files which were used to calculate the ratios. Then, to allow the comparison, the data was normalized by resting the value of each 100 m cell with the mean ratio for the whole survey zone for the period, and then dividing the result by the standard deviation of the whole survey zone. In consequence the new values are expressed as the number of standard deviations from the media of the period based in the 100 m cell raster.

The rings for demographic centralization was used to extract the average of standard deviation for each ring and explore if the household that were manufacturing pottery were all doing this in the same intensity (Figure 6-6). For instance, if the households of ring 2 have in average 0.5 standard deviations from the media, and the households of ring 4 have -0.2, then the households in ring 2 were, as a group, producing pottery in higher intensities than those in ring 4. In addition, having the data standardized in this way, permit to compare the degree of difference between groups of households, between districts and between periods.

During Period I, the largest SLC 101 had, in average, a more intense ceramic production than the average of the whole survey area for the period (Table 6-1), but these potter's households with relative higher engagement in craft production were located in the periphery of the district (Figure 6-6). In contrast, the households in SLC 102, and those living outside the districts had lower intensity of production. This indicates that the production in SLC 101 was carried out by few households in higher intensities (specialized households), while in SLC 102 it was carried out by many households in lower intensities (a town of semi-specialized potters).

During Period II, a moderate amount of pottery was manufactured in relatively higher intensities by households located outside the districts. In contrast, the producers in the districts were carrying out this activity in lower intensities than the whole survey zone average. Only districts 201 and 204 show relatively higher intensities, but the first near the demographic centers, while the second further away.

During Period III, ceramic production was concentrated in SLC 302 and 305, but only some of the households, usually located close but not in the demographic centers, engaged in higher intensity production. In contrast those producers in SLC 303 – the district with negligible production share- and those outside the districts were engaged in higher intensity production.

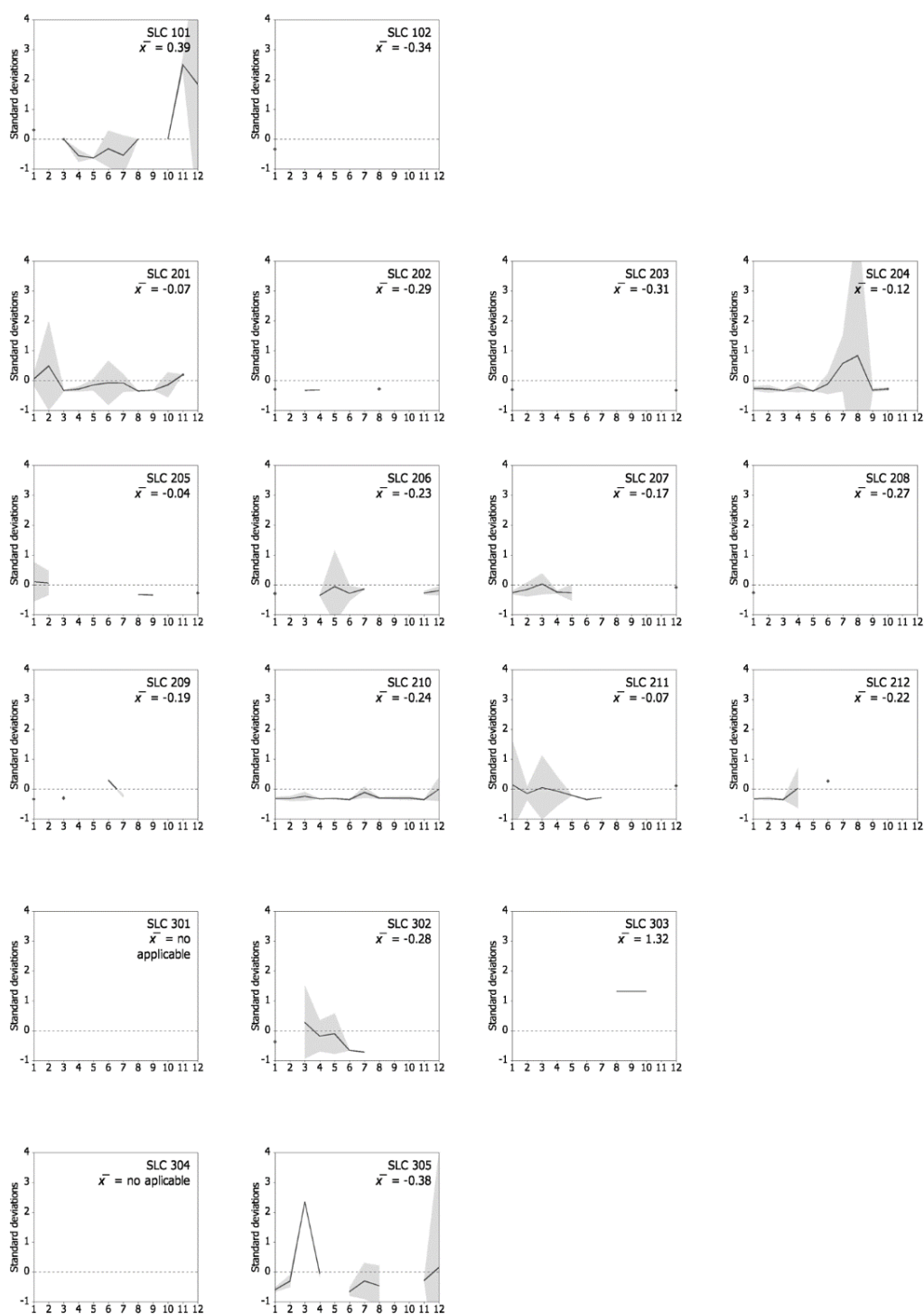


Figure 6-6 Graphs of the media of ceramic production intensity ratios per ring per district described as the number of standard deviations from the media of the district.

Table 6-1 Relative Intensity of Ceramic Production as Ratios of Sherd Scrapers and Total Sherds by Period by District.

Period	SLC	No of Cells (100 m Resolution)	Cer. Prod / Total # sherds Ratio		Production Intensity as Departure from Expectation ¹
			\bar{x}	σ	
I	101	3	0.31	0.35	0.4
	102	19	0.10	0.01	-0.3
	NonSLC	19	0.10	0.16	-0.3
II	201	44	0.06	0.08	-0.1
	202	7	0.01	0.01	-0.3
	203	4	0.01	0.01	-0.3
	204	39	0.05	0.11	-0.1
	205	10	0.07	0.08	0.0
	206	21	0.03	0.03	-0.2
	207	34	0.04	0.06	-0.2
	208	8	0.02	0.01	-0.3
	209	6	0.04	0.05	-0.2
	210	57	0.03	0.05	-0.2
	211	19	0.06	0.07	-0.1
	212	13	0.03	0.05	-0.2
	NonSLC	84	0.19	0.42	0.5
III	301	0	-	-	-
	302	22	0.08	0.10	-0.3
	303	3	0.33	0.00	1.3
	304	0	-	-	-
	305	73	0.06	0.10	-0.4
	NonSLC	62	0.19	0.19	0.5

Note: ¹ Mean of the ratio values of each 1 ha cell in each district or SLC (zero values not included), and expressed as the number of standard deviations from the media of ratios of the whole period (zero values not included).

In general, the tendency was to have higher intensities of production in households in the periphery of SLC 101 during Period I, and in households outside the districts during Period II and III. Households engaged in this activity inside the districts, were carrying out this only in moderate or low intensities indicating the lack of specialization during Period II and III.

The observed tendency at the regional scale for the three periods is that higher intensity indexes belongs to districts with a small proportion of the total regional pottery production, or households dispersed outside the districts. At supra-local community scale, those households with higher intensity than the average were usually located far from the demographic centers.

6.1.4 Leaders and Ceramic Production Locations

The previous analysis has shown that only in a few cases can the distribution of ceramic production activities can be explained solely by a district's internal population distribution. Indeed, what the B-indexes reveal is a wide variability, especially during Period II. Did the distribution of this productive activity and its variance relate to the location of leaders in the region? To answer this question I analyze the correspondence between the location of ceramic production and higher ranked households inside each supra-local community or district.

In Chapter 4.0 , an initial exploration of the relationship between rank and evidence of ceramic production was carried out using the survey collections as units of analysis. Elite control over pottery production would require an exclusive association with higher ranked households, and this possibility was quickly discarded in this preliminary analysis. In fact, during Period I, higher ranked households were not engaged in ceramic production at all.

In this section I take a different approach. I explore the spatial relationship between household of higher rank (Rank 1-3) and those engaged in pottery production. Political practices, such as feasts, are important loci of pottery consumption, and we would expect leaders might be an important group of consumers for these items. Consequently, it is expected that pottery production, while not necessarily carried out by higher ranked households, might be located close to them in order to provision their needs.

A correlation index based in the percentage of overlapping of buffer areas is used to compare not only the contents in each collection, but also those neighboring ones. Maps with buffers of 100 m were created around (and including) each survey unit identified as a higher ranked household/group showing ceramic production evidence. The total area of overlap was divided by the total combined area of both maps, and the results, expressed in percentages, can be considered as a correlation index between both maps (Adapted from Whallon 1974). An index of 100 will indicate a perfect matching between the location and frequency of higher ranked households and pottery production units (or that they are coming from the same collection), while an index of 0 will indicate that higher ranked households and all the potters' households are more than 200 meters apart of each other.

The results (Figure 6-7) indicate that during Period I, the spatial correlation between higher ranked households and ceramic production is low. Only 5% of overlapping was found at the regional level, and only in SLC 101 a 7% of overlapping was found, but the overlapping occurs mainly in the periphery of the district, and not in the demographic center.

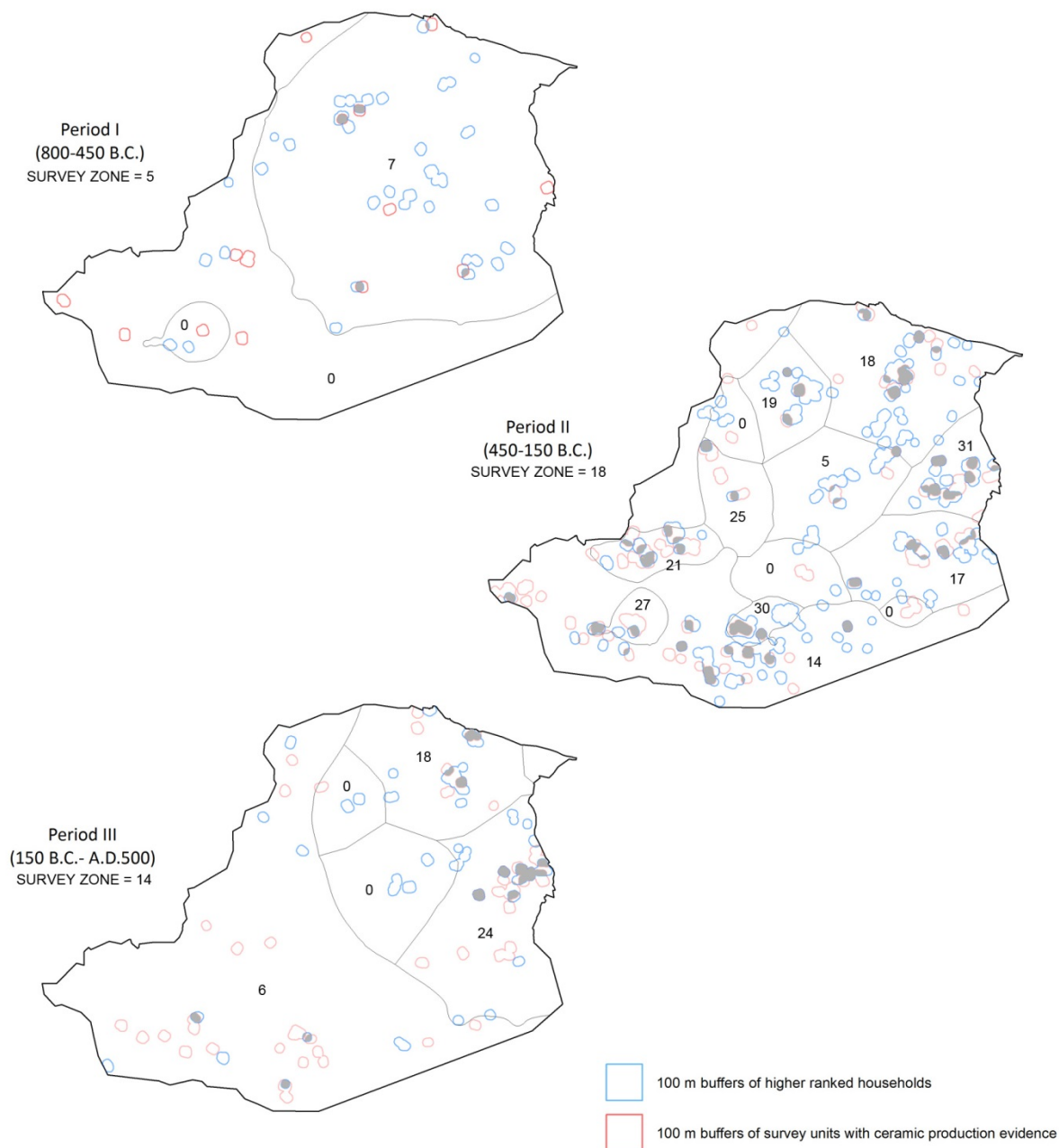


Figure 6-7 Correlation (as percentage of overlapping) between buffer areas of units with evidence of higher ranked households and evidence of ceramic production.

By the Period II, the correspondence increased to 18% in the region as a whole, but with a high degree of internal variance. Three districts show no spatial association between higher ranked households and the loci of pottery production. SLC 205 shows a very low correspondence (5%). SLC 201, 202, 207 and in the area outside the districts have values between 14 and 19%. The other districts have

higher values, suggesting that pottery production was carried out very close of leaders' households. Finally, during Period III, the correspondence increased to 14% in the region as a whole. There is a moderate correspondence only inside SLC 302 and SLC 305, the two dominant districts of the epoch. The others districts and the zone outside them show low or zero values.

In the three periods, the districts showing higher degrees of spatial correlation between pottery production and higher ranked households, also have a moderate correspondence between the latter and population distribution. Therefore, for these districts, it is very likely that pottery production was carried out at these loci because they were close to many consumers. This would have reduced the cost of transportation of the pottery to the users, and the chance of procuring a leader's "business" may have been an additional advantage of settling in such locations. Only in SLC 206, 210 and 211, the location of pottery production is more related to the location of affluent households than of clusters of population. It is possible that this proximity allowed leaders to influence or economically support production.

6.2 LONG-DISTANCE EXCHANGE COMMUNITY PATTERNS

The control over long-distance exchange networks of prestige goods or exotics has often been considered an important factor in the creation of political power (Blanton, et al. 1996; Earle 2002). However, control can be only secured when there are conditions that limit the availability or accessibility of the objects, as for instance scarcity of the product, specialized technology, spatially restricted sources, or limited communication routes. Sometimes these restrictions are intrinsic in the natural environment and geography of the region. At other times, these conditions are products of social factors such as the effect of inter-group conflict or monopoly behaviors.

It is expected that if exotics had these restrictions, they would have been unevenly distributed among and inside districts. If so, access to these objects must be related to the wealth, status and/or prestige of the households. On the other, if exotics were widely available and not particularly costly, we would expect to see a more even distribution, one cross-cutting household ranking.

Exotic or imported pottery from other regions, as defined in Chapter 3.0 , was only identified for Period I and III. In this section, I explore the relationship between demographic units, leadership households, and the exotic distributions in the survey zone.

6.2.1 Exotics Distribution

Exotics distributions were explored following a methodology similar to that used to analyze ceramic production patterns. The results are presented below in a map with the proportional distribution of exotics in the region (Figure 6-8), and bullet graphs comparing the expected and observed frequencies (Figure 6-9).

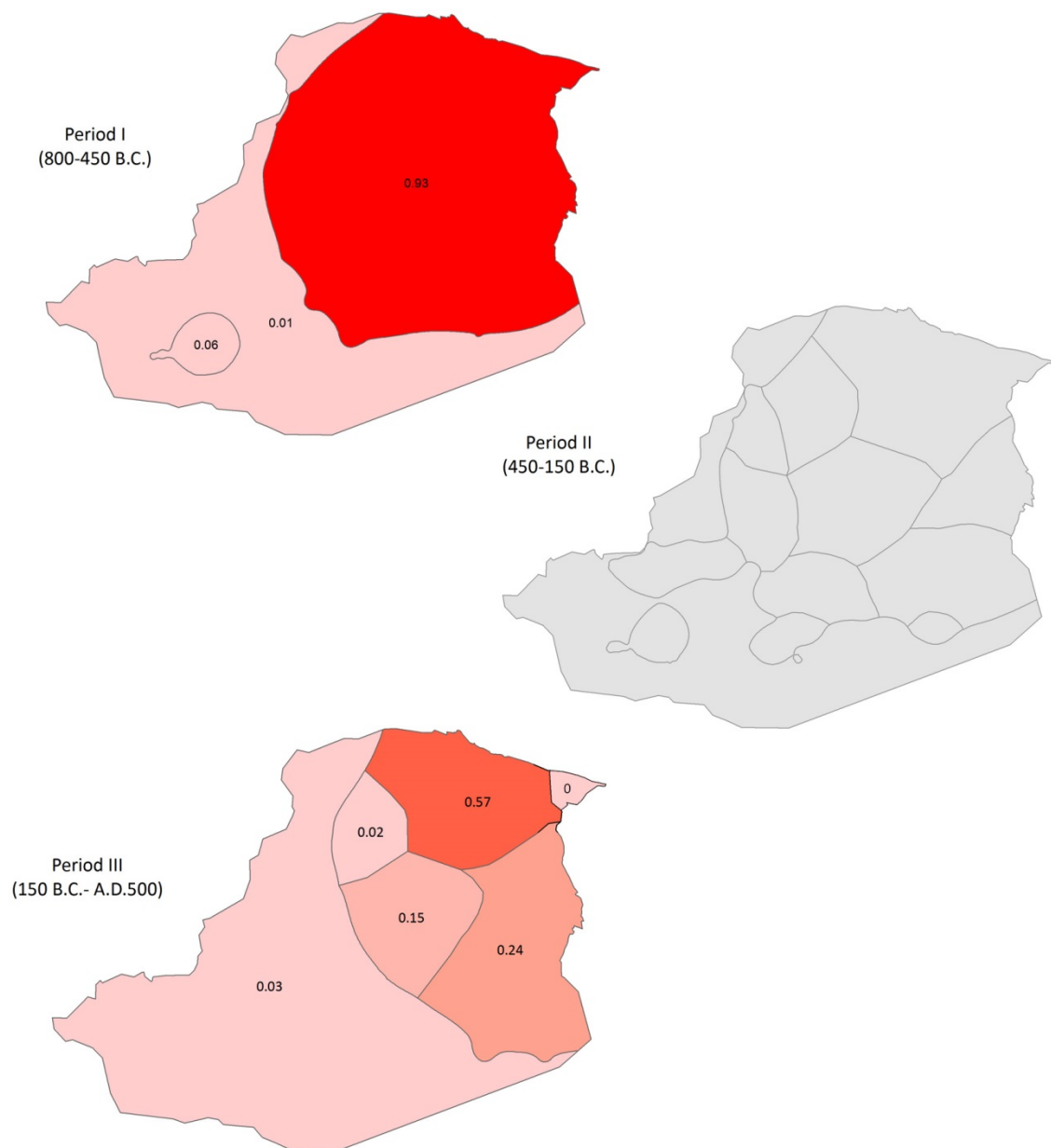


Figure 6-8 Regional distribution of exotics based in the share from the total amount estimated in the survey area.

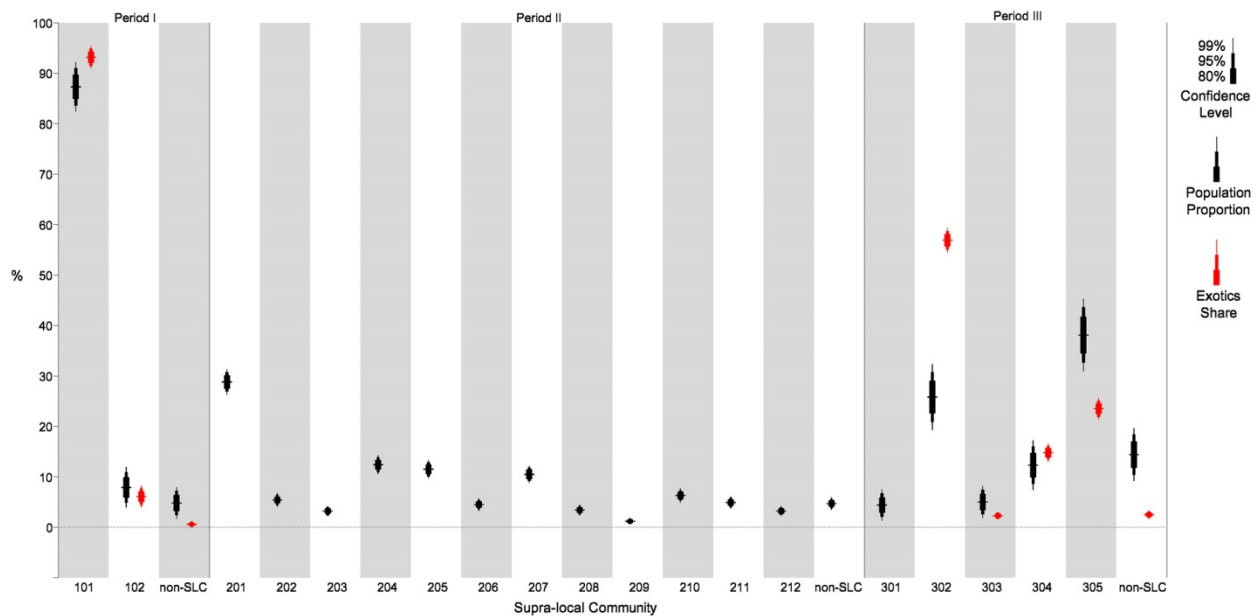


Figure 6-9 Comparison with bullet graphs of the demographic and exotics proportions for each supra-local community during Period I, II and III. Population sample size is the number of households in the survey zone, while the exotics sample size is the estimated number of imported sherds.

In Period I, the majority of exotics were found in the district SLC 101. However, the distribution of exotics have only a slight difference from the distribution of population in the region. If only data from supra-local communities are considered, the difference between expected and observed distribution is small and not very significant (difference of 2%, and $0.2 < p$).

During Period III, the distribution of exotics between districts contrast strongly and significantly with the expectation based on their population distribution. SLC 302 shared a large proportion (57%), while SLC 305 shared a smaller proportion (24%) of the total number of exotics of the survey zone. However, SLC 305 was the most populous district of the period, indicating that the inhabitants of SLC 302 consumed more exotics per capita than any other district of the region. This finding suggests: a) that SLC 302 residents may have exercised dominance in the access of such networks in the region; or b) that residents (particularly higher ranked households) had different consumption patterns than those of SLC 305.

6.2.2 Exotics Concentration

The abundance and distribution of exotic pottery inside districts was explored in ways similar to how ceramic production was analyzed. The results are shown in Figure 6-10 and Figure 6-11. During Period I, at the regional scale, the distribution of exotics roughly corresponded to population distribution. Inside SLC 101, exotics were widely distributed, dispersed, and roughly corresponded to the distribution of population. Exotics were partially associated with the household clusters as visible in the distribution peaks in the rings 6 and 8. In contrast, in SLC 102 exotics are more abundant at certain distance from the demographic center, but in this case we must keep in mind the relatively smaller size of this district.

During Period II, the long-distance exchange networks did not bring in exotics, and a new network emerged during Period III. In contrast with the situation of Period I, during Period III most of the exotics were highly concentrated in households in or near to the demographic centers of SLC 302, 304 and 305 (Figure 6-10 and Figure 6-11). Only SLC 303, had a low index, but it is also a district with a very small proportion (2%) of the total number of exotics in the region.

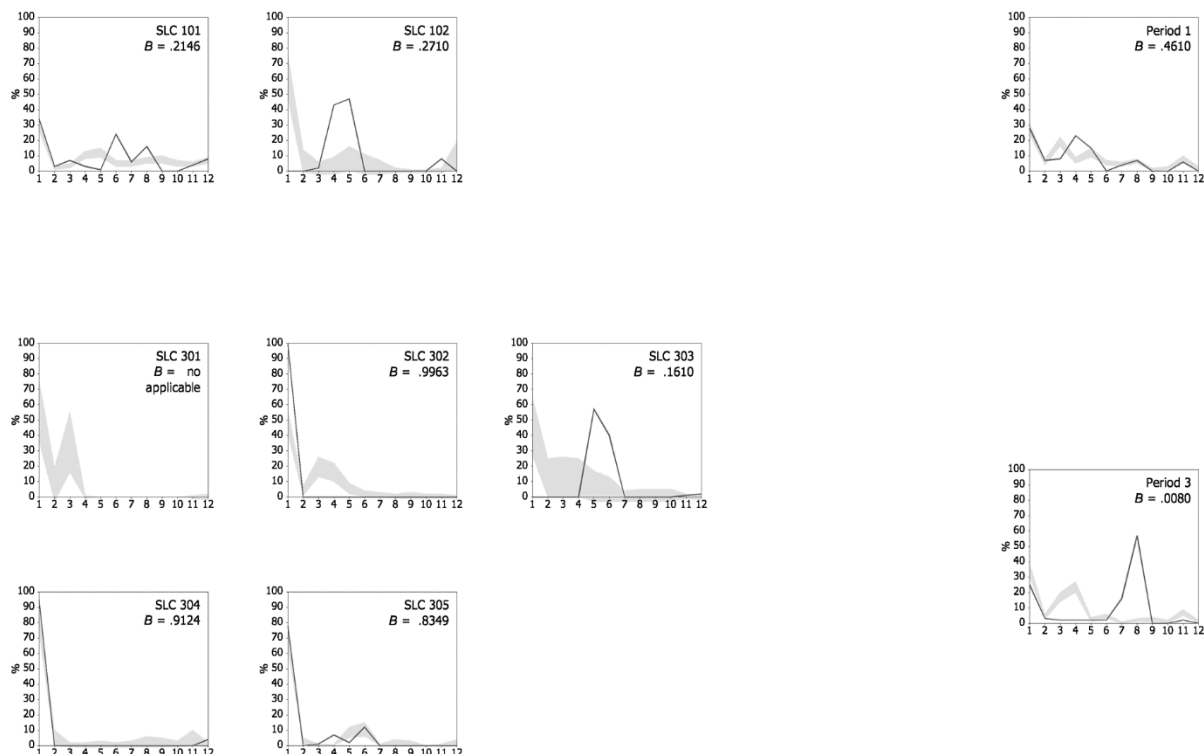


Figure 6-10 B-values and centralization graphs for exotics distribution, contrasted with the 90% confidence zone of population proportions (shaded area) for each supra-local community (SLC) or district by Period. The two graphs of the right show the same estimates for the whole survey zone by period.

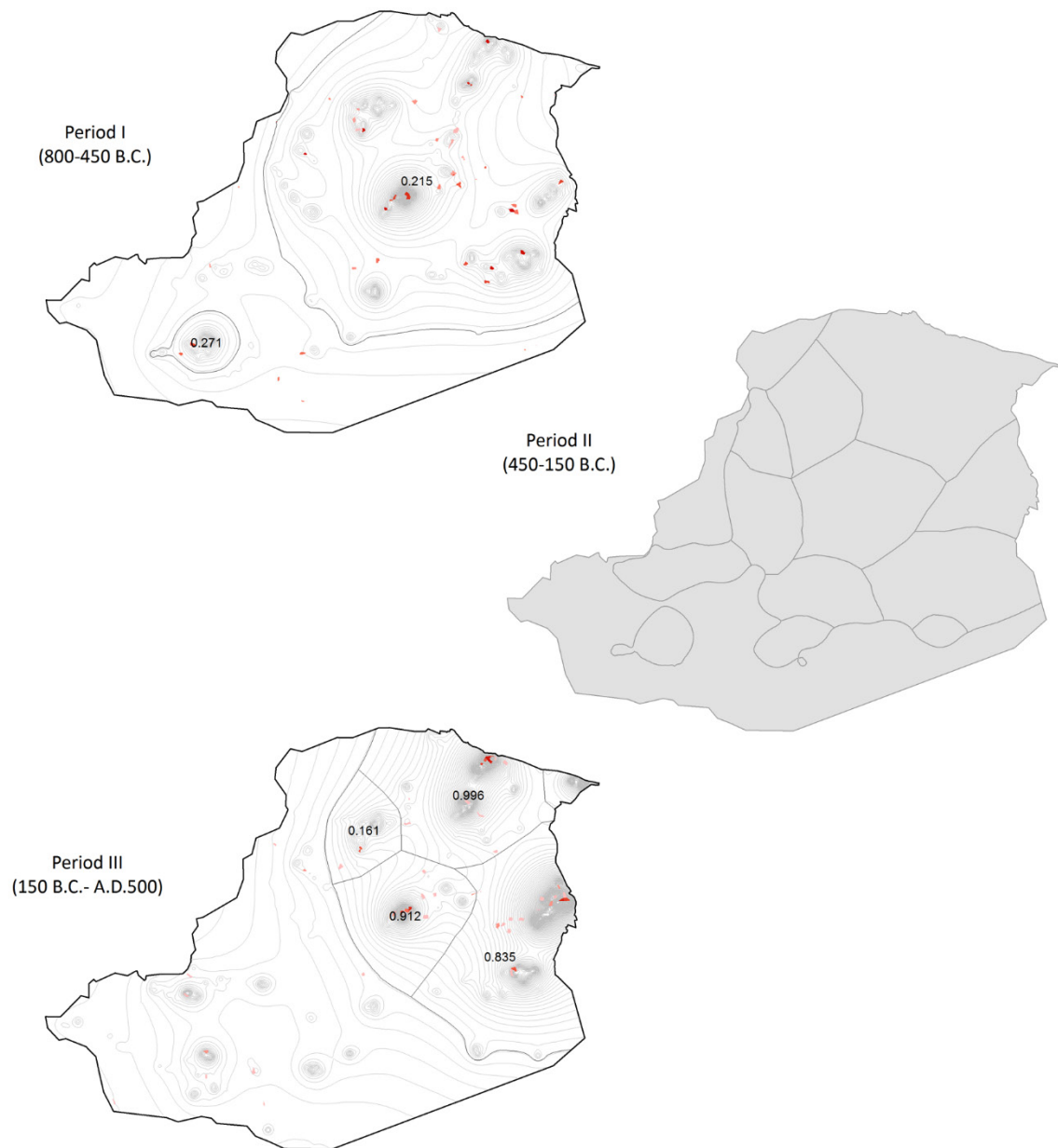


Figure 6-11 Map showing the degrees of concentration (B-values) of exotics around the demographic centers in each district. Density of exotics from a 10 m resolution raster (red) and population density (contour lines) are displayed for comparison.

6.2.3 Leaders and Exotics

The distribution of exotics in the region can be explained by two alternatives. The first possibility is that exotics were distributed in the same way as local pottery. In this case, the location of exotics would be expected to have no spatial relationship with leaders' residences. The second possibility is that leaders played a disproportionate role in acquisition and redistribution of exotics. Because distance is considered in this research as an indicator of the strength of interaction, we would expect that if leaders redistributed exotics, these objects will be more common close to their residences.

The analysis of the relationship between leadership and the exotics was carried out in the same manner in which the relationship between leadership and ceramic production was explored. The results for Period I in Figure 6-12 show a moderate degree of correspondence between affluent households and exotics inside and outside the districts. Although the distribution of higher ranked households and exotics correlates with population distribution, indicating that exotics abounded where more people were, exotics were more ubiquitous in higher ranked than lower ranked households (Chapter 4.0). In fact, in SLC 102, exotics are more common far from the demographic center, where a higher ranked household was identified. In consequence, exotics are more associated with leaders, and lower ranked households' access to exotics depend partially on spatial proximity to leadership households.

During Period III, in the two dominant districts, SLC 302 and 305, the strong correspondence may be explained by the high correlation that exists between higher ranked households, exotics, and population distribution. However, the degrees to which leaders concentrated (B-values) are higher than the concentration of the population, indicating that some link exist between these variables. In fact, in SLC 304 there is a moderate correspondence, although there is no correlation between leadership location and population concentration (Figure 5-19). The analysis in Chapter 4.0 shows that exotics are consistently more ubiquitous in Period III higher ranked than in lower ranked households. This evidence suggests that trafficking and use of exotics may have formed part of the construction of leadership during this period. Very likely, these higher ranked households were the main consumers of such objects, but they were also playing important roles in their distribution to other households in the survey zone.

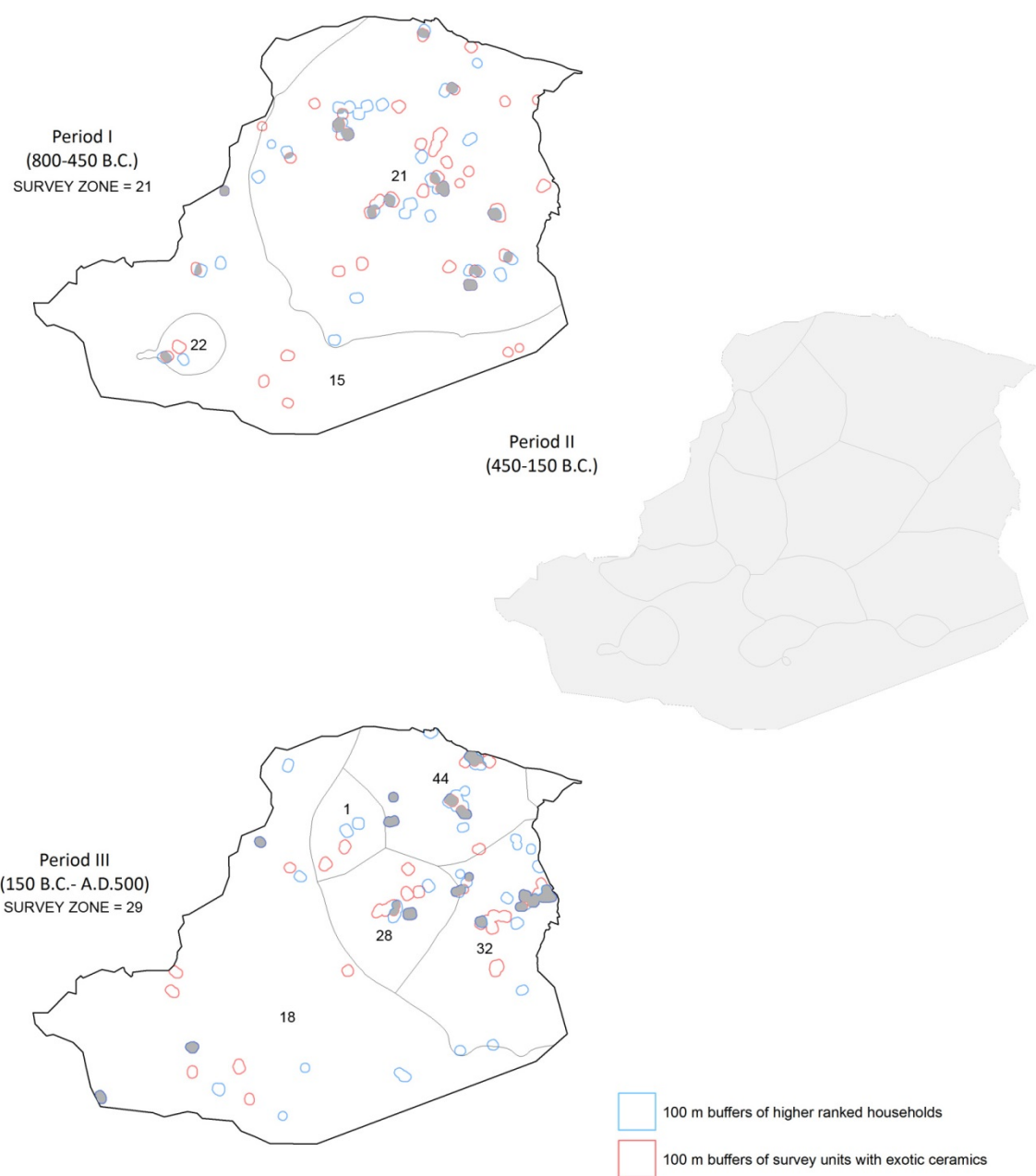


Figure 6-12 Correlation (as percentage of overlapping) between buffer areas of higher ranked households and evidence of exotics by period.

6.3 SUMMARY AND INTERPRETATIONS

The four dimensions in which ceramic production have been analyzed show a very complex situation in the Middle Nepeña Valley between 800 B.C. and A.D. 500. During the Late Formative Period (Period I), ceramic production was carry out mainly by households in the two supra-local communities. However, only half of the pottery of the survey zone was manufactured in the largest district SLC 101, which contained well over half of the survey zone population. Within SLC 101, pottery production took place in the outer half of the district, where population density was lower, but in proximity to the smaller, hinterland clusters of population. The scale of pottery production in SLC 101 was incommensurate with its population, and it is very likely that household provisioning of pottery required economic exchange with producers outside its boundaries, including those in SLC 102.

SLC 102, located to the west, was a supra-local community one tenth in size of SLC 101, but producing almost the same proportion of pottery. The uneven distribution of production relative to population at the regional scale may have encouraged economic integration among households within districts and between them. In SLC 101, most of the pottery production was carried out by a few households engaged intensively in this activity in the periphery of the district, while, in SLC 102, production was carried out by more households but at lower intensity in the center of the district.

During Period 1, the distribution of exotics roughly correlates with the relative demographic proportions of the districts. Exotics were widely distributed in areas with relatively high population densities, including the demographic center of SLC 101, and its smaller peripheral villages and towns. Although exotics were more common in affluent households (Chapter 4.0), they were also found among lower ranked households. The moderate correspondence between exotics and affluent household suggest that leaders were disproportionally involved in their distribution/consumption. As suggested earlier, this involvement may have been part of local leader's articulation with the Cupisnique-Chavín complex. The concentration of exotics around at ceremonial center (see Chapter 8.0) would support the hypothesis that exotics could have been exchange or redistributed in the context of Cupisnique-Chavín ritual practices.

In the Final Formative (Period II, 450-150 B.C.), ceramic production was carried out by both households within supra-local communities and by households outside these districts. The contrast between the observed and expected remains of production reveal significant differences among districts. To summarize, a set of four large districts (SLC 201, SLC 202, SLC 203 and SLC 205) could not produce enough pottery for their own consumption, and their member households would have depended on the

surplus produced in neighboring districts, or isolated households outside them. Despite the variability in centralization of production, some of the districts exhibited highly concentrated ceramic production in their demographic centers.

There was a reduction of the centrifugal tendencies of pottery production during this time (from Period I, $B=-0.390$, to Period II $B=-0.172$, Figure 6-13). The decrease in variability (standard deviation) between Period I and II, may be the result of the small sample of the first ($N=2$) in comparison with the later ($N=12$). Finally, the intensity of production was, in most of the districts, lower than the regional average for the period. Only the households located in the peripheral sectors of the districts, or in those districts with negligible production share, had relatively higher intensity in pottery manufacture.

Outside the districts, dispersed households and small towns produced, at a relative high intensity, a moderate proportion (~14%) of the pottery of this period. They producers may have supplied those districts with pottery production deficits. Therefore, while the demographic distribution suggests a highly fragmented political landscape, the patterns in pottery production in the survey zone indicate a moderate degree of economic interdependency among districts, and between districts and dispersed household outside the districts.

No clearly imported trade pottery was found for Period II. This lack of long distance exchange pottery may be explained by the context of increased violence that dominated the region during this time (Arkush and Stanish 2005; Billman 1999; Chamussy 2009; Ghezzi 2006; Ikehara and Chicoine 2011; Wilson 1988). The increased conflict may have made long-distance exchange dangerous activity, and pan-regional networks of exchange were replace by smaller local ones (Ikehara 2010a).

During the first half of the Early Intermediate Period (Period III, 150 B.C.-A.D. 500), ceramic production was dominated by two districts, SLC 302 and SLC 305. In them, pottery production was highly concentrated in the demographic centers and in relatively proximity to leadership households. Dispersed households, and small towns outside districts, produced a significant proportion (27%) of the pottery, and in contrast with those households inside districts, did so more intensively. For these outlying producers, ceramic production may have been a more important economic strategy than for producers within the districts.

The distribution of exotics in the Late Formative (Period I) and early part of the Early Intermediate Period (Period III) sharply contrast. Following the first century B.C., long-distance exchange networks were reestablished in many regions of the North Coast and North Highlands. Highland Recuay style pottery has been previously found in a wide region, even in contexts clearly pertaining to coastal affiliations (Lau 2002b, 2005; Wilson 1988). A site in the Nepeña Valley, Huancarpón, corresponding to

the demographic center of SLC 302 - the district with a high proportion of exotics- has even been described as a Recuay settlement (Lau 2011:45). There is a large cemetery in Huancarpón's plaza (Proulx 1985), but exotics in the Recuay style have also been found in areas where dwellings may have stood.

In Period III, exotics were more common in higher ranked households (Chapter 4.0), and lower ranked households with exotics were located close to higher ranking ones. In addition, in both, SLC 302 and 305, the degrees of concentration of affluent households and exotics are disproportionately higher than the relative population concentrations. These distribution shows that exotics were not simply more frequent where there are more people, but that leaders acquired and consumed disproportionate amounts of exotics, and were probably involved in their distribution to lower ranked households. Leadership involved domination of long distance exchange ties.

In general, we can note a dramatic change during Period II. The demographic fragmentation of the survey zone into multiple autonomous social units was accompanied an increased variability in how craft production (ceramic production and distribution) was organized within districts. The spatial disparities between producers and consumers among districts indicate a complex situation in which demographic, political, and economic boundaries did not necessarily match.

The patterns seen in ceramic production (Figure 6-13) reflect the importance of this activity in bringing some degree of economic integration among the communities, despite the increased demographic (and likely political) fragmentation of Period II. The moderate association between this ceramic production and higher ranked households can be explained by the preference of potters to live in or close to village and towns. Seen in this light, pottery production was a grassroots economic system that was minimally influenced by the boundaries of the demographic units of political activity, especially during the Final Formative Period (Period II).

Exotic pottery was produced outside the Valley. The moderate association of this material with higher ranking households suggests that its display had some degree of importance in the construction of their status. It was more widely dispersed during Period I, indicating relatively wide access to it. One explanation was that it was redistributed during the large ritual aggregations in the ceremonial centers. In contrast, during Period III, exotic pottery was highly concentrated in two large towns, where most of the higher ranked households were located. Even those lower ranked families with access to exotics were living close to the leaders. This should be considered as indicating the dominance of leaders over the networks of exchange and redistribution of such objects. In contrast to the distribution of local pottery, exotic pottery was, at least moderately, to distinguish "elite" lifestyles.

In sum, ceramic production and the distribution of exotics were distinct systems. Pottery manufacture was never highly centralized or specialized (in the form of central workshops or “attached” production), but was mainly a domestic economy activity, that served to economically integrate social units in the region. As seen in Chapter 4.0, in some districts, leaders seem to have been more associated with this activity than in other districts. In contrast, exotic pottery procurement was an important component in the constitution of leaderships during two epochs; first as part of the Cupisnique-Chavín network during the Late Formative (Period I), and later as part of a network of highland-coastal interaction during the Early Intermediate Period (Period III). Exotic pottery did not have this role in Period II. The processes following the disintegration of the Cupisnique-Chavín Religious Complex were manifested in a fragmented landscape with high variances of economic and political responses. Long-distance networks disappeared, and pottery manufactures was organized in many different ways.

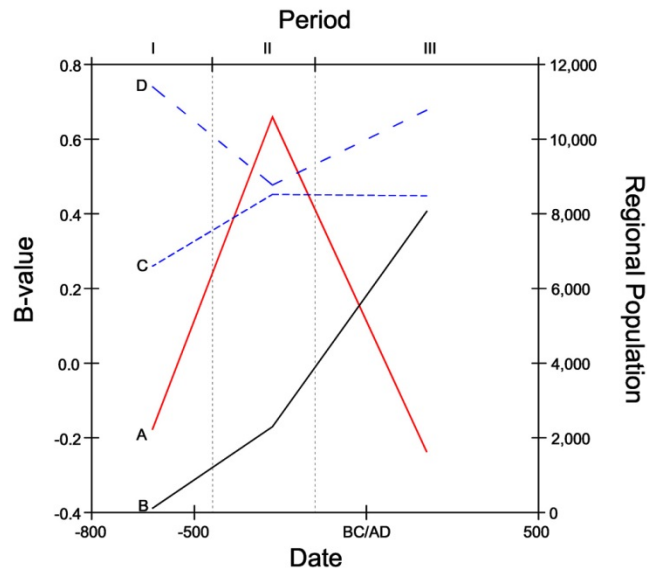


Figure 6-13 Summary graph of ceramic production tendencies by period: A) Absolute regional population size, B) B-value for the whole survey zone, C) average B-value of the districts per period, and D) standard deviation (δ) of B-values of the districts per period.

7.0 AGRICULTURAL POTENTIAL AND SOCIOECONOMIC PATTERNS

By the Late Archaic Period, and probably even earlier, farming was already an important economic activity for Peruvian coastal populations (i.e. Bonavia and Grobman 1989; Shady 2003). Agricultural activity, complemented by fishing, hunting, and gathering of wild resources, may have sustained daily subsistence, and provided resources to fund political activities (i.e. Dietler 2001). Control of circumscribed resources and surpluses could have been part of emergent elite strategies, and the basis for social stratification (Santley 1993). Consequently, in the study of how leadership is constituted in prehistoric agricultural societies, the relationship between leadership and staple production must be addressed.

7.1 SOILS AND AGRICULTURAL POTENTIAL

On the desert coast of Peru, agricultural potential relates to two main factors: the characteristics of the soil and the availability of water. Information about natural resources, including soil characteristics and potential, for the Santa-Lacramarca and Nepeña valleys is available in the 1972 *Oficina Nacional de Evaluación de Recursos Naturales* (ONERN) report. Originally, the soils in the Moro Pocket were evaluated only for those lands that were under cultivation by the 1970s. In order to extend the classification to the rest of the survey zone, soils identification were extrapolated comparing the report's descriptions with direct observations of terrain conditions carried out during the fieldwork.

Soils patches were digitized using the Geoeye high resolution satellite imagery and the ONERN soil map. The boundaries of each soil class patch follows recognizable topographical features and/or modern land divisions (Figure 7-1). This coincidence allowed me to deal with spatial incongruities resulting from the lack of spatial accuracy and the low resolution of the original soil map. It also allowed me to delimit smaller soil patches missed in the ONERN map and to classify soils outside the limits of the

original study. As result, nine soils types were identified (Table 7-1), with most of the landscape (61.3%) corresponds to mountains (M) and the riverbed or riverine zone (RW), lands that cannot be cultivated without drastic terrain transformation and/or soil improvement.

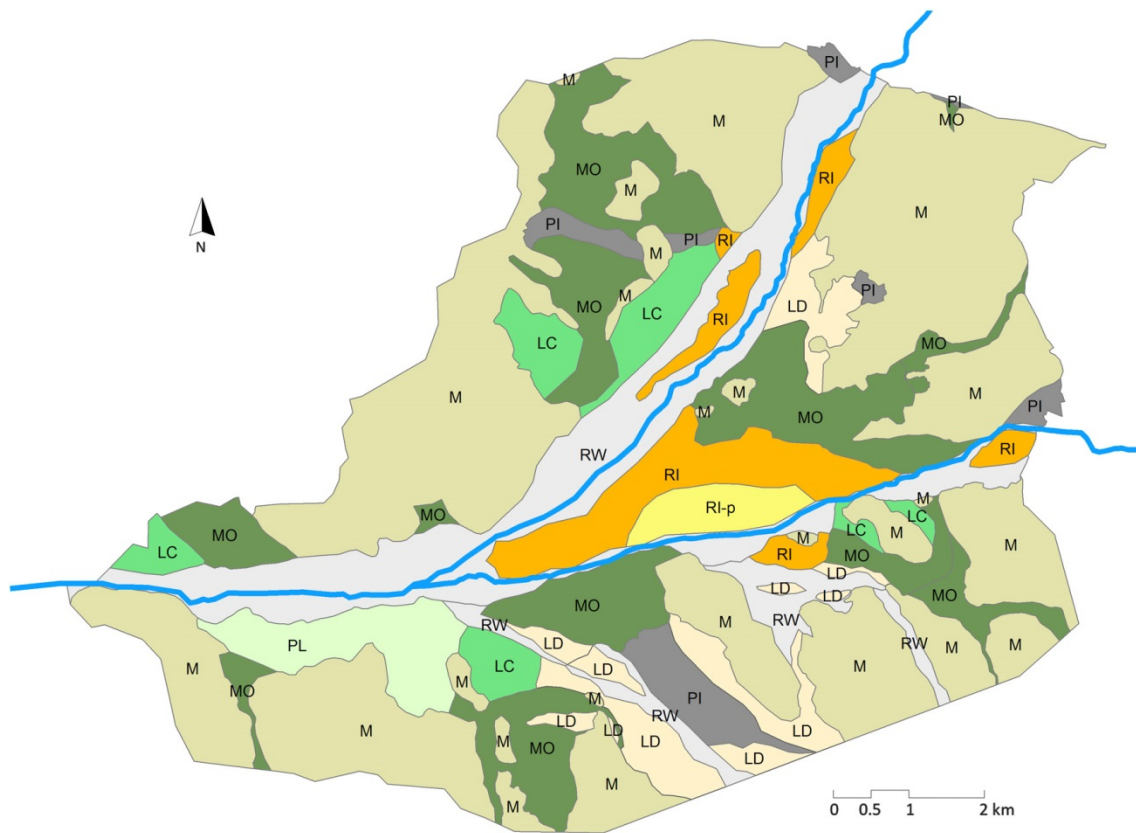


Figure 7-1 Map with the soil types in the survey zone.

Table 7-1 Soil Types in the survey zone.

Soil Name	Code	FAO classification	Area (Ha)	Proportion (%)
<i>Lacramarca</i>	LC	Eutric fluvisol	358.9	4.1%
<i>Palenque</i>	PL	Eutric regosol	261.6	3.0%
<i>Motocachi</i>	MO	Eutric regosol	1433.3	16.3%
<i>Ribereño</i>	RI	Eutric fluvisol	512.4	5.8%
<i>Ribereño pedregoso</i>	RI-p	Eutric fluvisol	124.9	1.4%
<i>Lindero</i>	LD	Eutric fluvisol	451.1	5.1%
<i>Piedras</i>	PI	Eutric fluvisol	252.7	2.9%
<i>Cauce de Río</i>	RW	Fluvisol	1281.7	14.6%
<i>Cerros</i>	M	Lithosol	4103.0	46.7%
Total	-	-	8779.4	100.0%

Based on their physical properties, the soils were ranked in six classes by ONERN, five of which are present in the Moro Pocket (Table 7-2, Figure 7-2). Physiography describes the physical conditions in which the soil was formed and deposited, while slope describes the inclination of the soil layer. Both features determine the risk of erosion, whose principal agents are the rivers. Drainage and permeability determine how plant roots can be adequately watered in a specific soil. Salinity is the degree of salt content in the soil which affects negatively the capability of moist retention of the plant. This feature is low in the whole survey zone. Fertility affects directly the development of the plants and it is a qualitative assessment of the availability of nutrients in the soil. Finally, soil depth is important for the development of a plant's root systems, the more shallow the soil, the less the maximum growth potential for the plant.

Table 7-2 Characteristics of the soils types in the survey zone.

Soil	Physiography	Slope	Depth (cm.)	Drainage	Permeability	Erosion Risk	Salinity	Fertility	ONERN (1972) Class
LC	Alluvial plain, flood / sedim. plain	1-2%	120	Good	Moderate	None / Low	Low	Good	1
PL	Flood plain, alluvial fan	1-2%	80	Fairly Excessive	Moder. fast	Low	Low	Medium to High	2
MO	Alluvial fan	3-12%	20	Fairly Excessive	Moder. fast	Low	Low	Medium	3
RI	Flood plain	1-2%	20	Fairly Excessive	Moder. fast	Low to moderate	Low	Medium	3
RI-p	Flood plain	1-2%	20	Fairly Excessive	Moder. fast	Low to moderate	Low	Low	4
LD	Piedmont alluvial plain	3-12%	20	Good	Moderate	Low	Low	Low	4
PI	Piedmont alluvial plain	3-12%	< 20	Excessive	Moder. fast to fast	Low	Low	Low	4
RW	Flood plain	1-2%	-	-	-	-	-	-	6
M	Mountains and hills	+12%	-	-	-	-	-	-	6

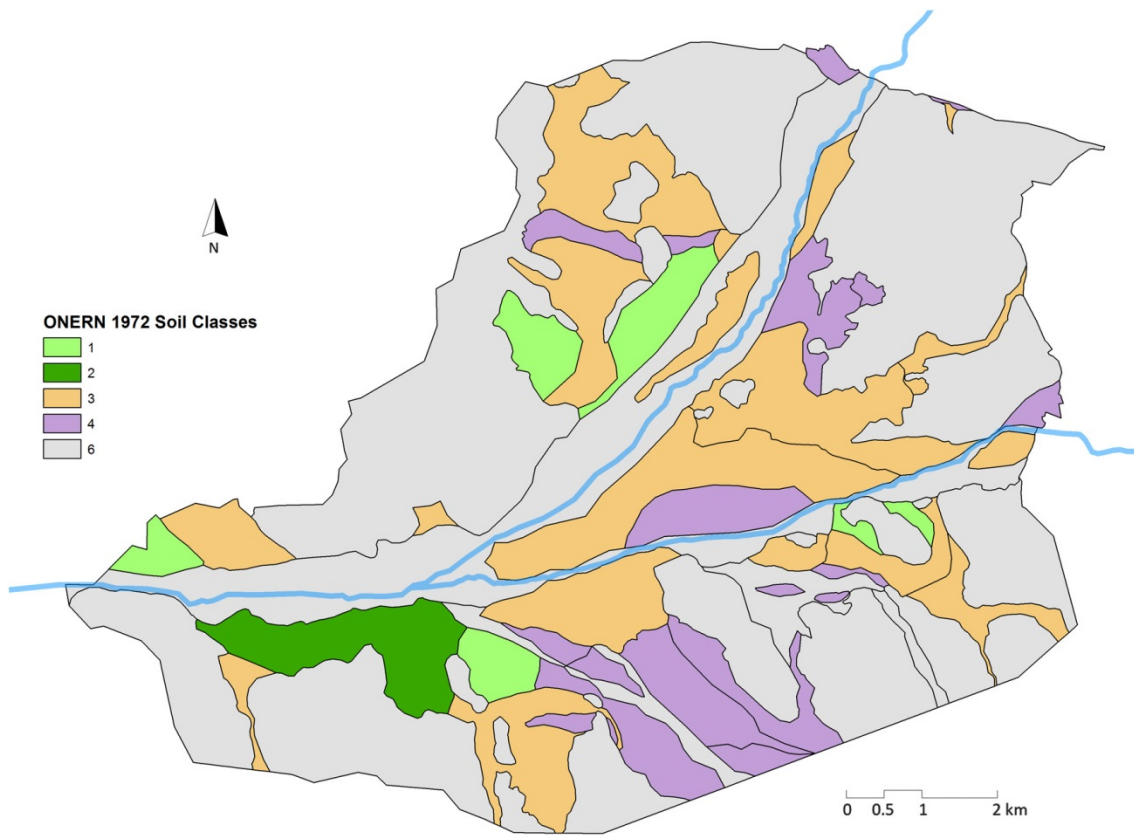


Figure 7-2 Map with the soil ranks (ONERN 1972) in the survey zone.

The region is characterized by low precipitation (See Chapter 2.0); consequently agricultural activity relies very heavily on the availability of water from rivers and springs. Artificial irrigation expands the limits of cultivatable land, and, under certain circumstances, irrigation activities can create conditions for the emergence of power relations (Billman 2002; Wittfogel 1957). However, the study of pre-Hispanic irrigation systems is a very difficult task because they are continually repaired, modified, and replaced. Some of the pre-Hispanic systems are still in use, and can be indistinguishable from modern ones built with the same technology. Too, systems can consist of several components built at different times (Castillo 2010; Hayashida 2006). The combination of these factors complicates the assessment of the antiquity of each sector of the system.

The approach taken in this section uses the modern distribution of irrigated lands, with the assumption that they, at least in part, could correspond to pre-Hispanic ones. It could be argued that modern technology makes possible the use of lands that was not available prehistorically for agriculture. However, in fact, it seems that the extension of the area under modern cultivation could be even smaller than pre-Hispanic ones. Sections of ancient agricultural canals have been recorded in portions of the

territory that are now abandoned. (Figure 7-3). For instance, the San Juan pampa could have been under cultivation during the Middle Horizon Period or the Late Intermediate Period (Period IV and V). Other features that have been also added to the landscape in the last three decades of agricultural expansion (i.e. reservoirs). Because the ONERN (1972) report is the oldest reliable available information, the reconstruction of ancient agricultural landscape is only tentative, and these factors have to be kept in mind in considering the strength and scope of the results of this analysis.

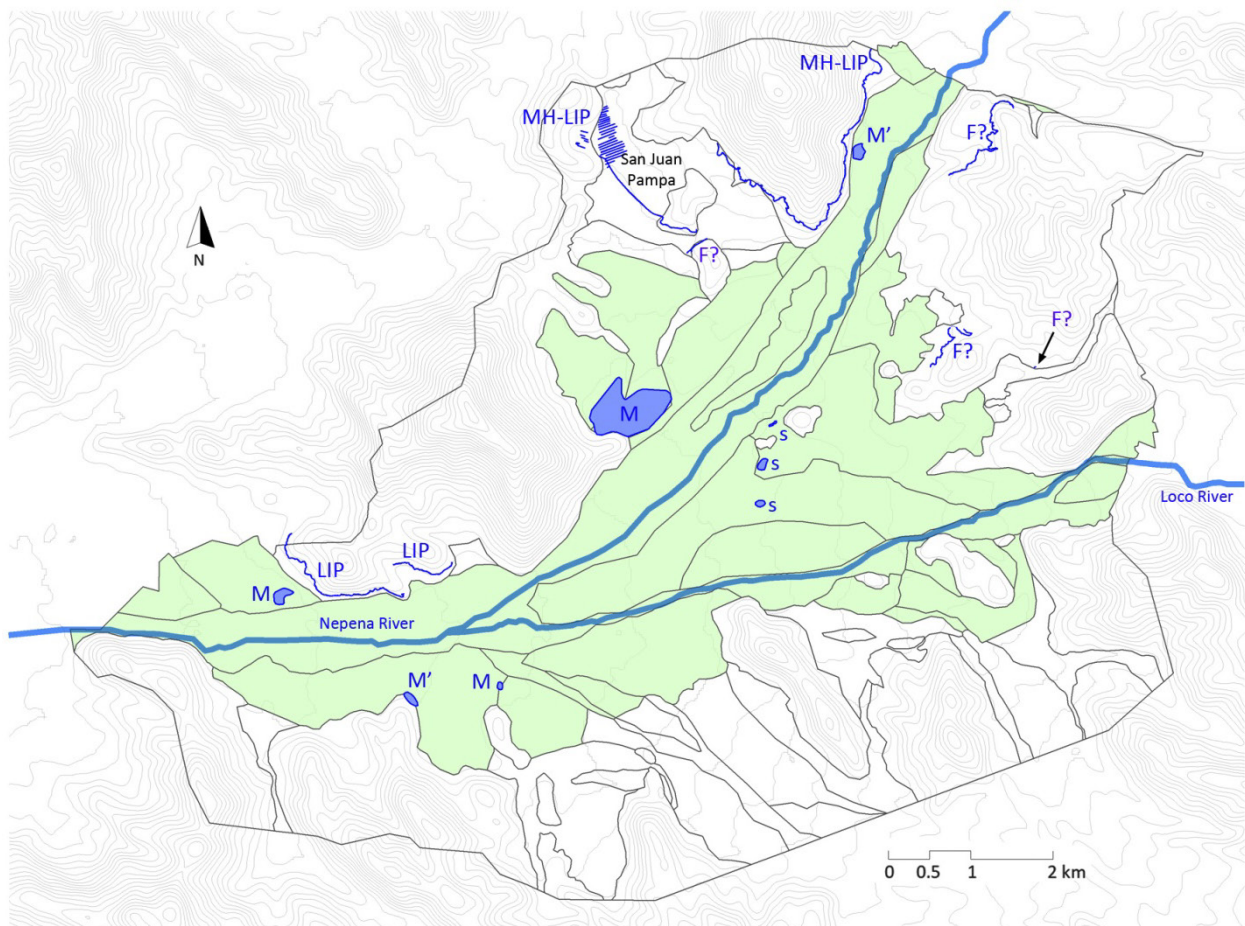


Figure 7-3 Map with the water availability (green) in the survey zone. Canals and reservoirs are interpreted as: possible Formative Period (F?), Middle Horizon Period (MH), Late Intermediate Period (LIP), and modern (M). Springs recorded during the fieldwork are indicated as (s).

7.2 AGRICULTURAL POTENTIAL AND DEMOGRAPHIC PATTERNS

The relationship between the soil quality and agricultural potential and population is evaluated by comparing the distribution of households and with soil types in the landscape. On the one hand, if people were just randomly distributed in the survey zone, we would expect a correspondence between the proportions of people on each soil, and the availability of the later in the survey zone. On the other hand, if households were interested in the agricultural potential of the terrain, we would expect to see a preference for occupying the best soils. If negative or no correlation is found, either households were not following an infield residential pattern or they were other factors more important than agricultural potential in play in determining settlement preferences.

Using the data of the number of households by periods and soils spatial data, I compared the proportions of each soil type in the landscape with the proportion of population in each soil by period. Confidence levels at 80, 95 and 99% were obtained using the total of hectares for samples sizes for each type of soil, while the estimated total number of households was used for the sample sizes of each period. The results (Figure 7-4) show that, for the three periods under study, there were less occupation in arable lands. Indeed, soils such as *Lacramarca* (LC), *Palenque* (PL) *Ribereño* (Ri) and *Riberereño Pedregoso* (Ri-p) were almost unoccupied during the three periods. In contrast, mountains and hills (soil M) have a high preference. The proportion of people who were living in the hills presents a strong and very significant difference from the natural occurrence of this type of soil in the survey zone. Finally, the riverbed (soil RW) was almost unoccupied. This could be the result be the result of the destruction of archaeological remains by the effects of the erosion of the river, but it is more likely that no households ever occupied intensely this soil because the threat of inundation during the summer is very high.

The tendency of households to live outside of cultivable land is even stronger if the distribution of population is contrasted with the availability of water (Figure 7-3, Table 7-3). In sum, during the three periods under study, most of the dwellings were built in lands where cultivation was almost impossible.

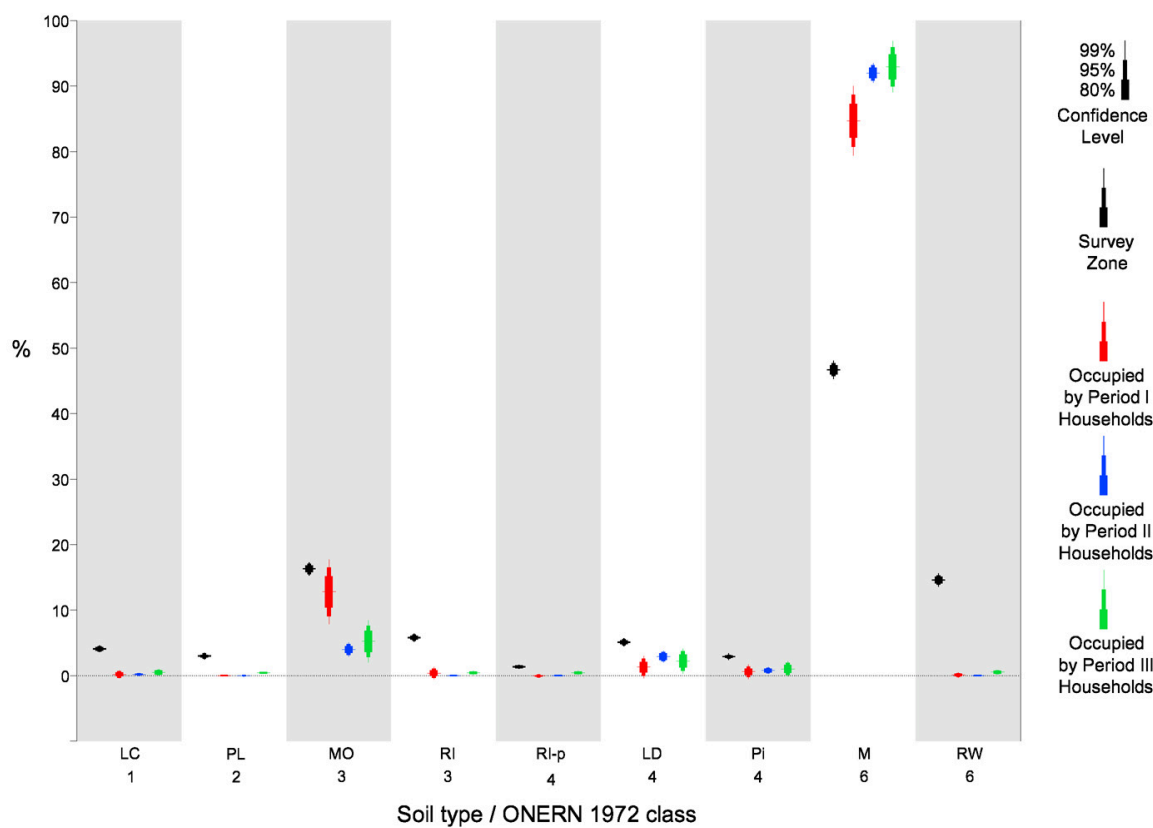


Figure 7-4 Comparison with bullet graphs of the natural occurrence of soil types with the proportion of households in each soil type by period.

Table 7-3 Distribution of households according to irrigation potential.

Period	Water No Available	Water Available	Total
(landscape)	0.62	0.38	1
I	0.95	0.05	1
II	0.98	0.02	1
III	0.98	0.02	1

7.3 AGRICULTURAL POTENTIAL AND LEADERSHIP

If the previous analysis has shown that people were not living amidst their garden plots, any analysis of the correspondence between household rank and agricultural potential based on exact house location can be misleading. Instead, I will compare rank with the resources available in the area defined by the catchment zone of each household.

Catchment zones were defined for those survey units in which: a) sample size was not a problem (number of sherds ≥ 5); b) there were no ritual caches (fineware ratios ≤ 0.9); and c) we can be confident that they represent more or less permanent households (population estimate ≥ 1 person in average during each century of occupation). Although this procedure permits us to have more confidence in the results, for some rank categories the sample size became very small, introducing concerns as to the significance of the comparisons (Table 7-4).

Table 7-4 Sample sizes of rank classes per period.

Period	Rank 1	Rank 2	Rank 3	Rank 4	Total
I	3	6	16	113	138
II	6	2	32	535	575
III	3	3	8	161	175

The catchment zones for each household or group of households were defined by delineating buffers around the polygon of each survey unit. In this attempt, I am not trying to define the real area used by these households to extract resources, but I am using this tool to compare the relative productivity of the landscape surrounding their residences. The assumption is that if authority and power of leaders was related to the control over agricultural resources they should have had preferential or disproportionate association with high quality soils (Class 1 and/or 2). Utilization of better soils would have allowed households to become wealthier (i.e, leadership households). Thus, household ranks would correlate with the distribution of such soils. If not, their location should be related to other factors, or higher levels of staple production was not part of their leadership.

The definition of a proper distance to create buffers was made by trial and error instead of through theoretical deduction. A distance of one kilometer, or about 10-15 minutes walking, was initially considered, however the catchments overlap that much that it was difficult to differentiate each one. In contrast, 100 meters define catchments that doesn't include the agricultural lands that were adjacent to

the hills where most of the households were located. Therefore, buffers of 500 meters seemed to be the less problematic choice for this comparative task (Figure 7-5).

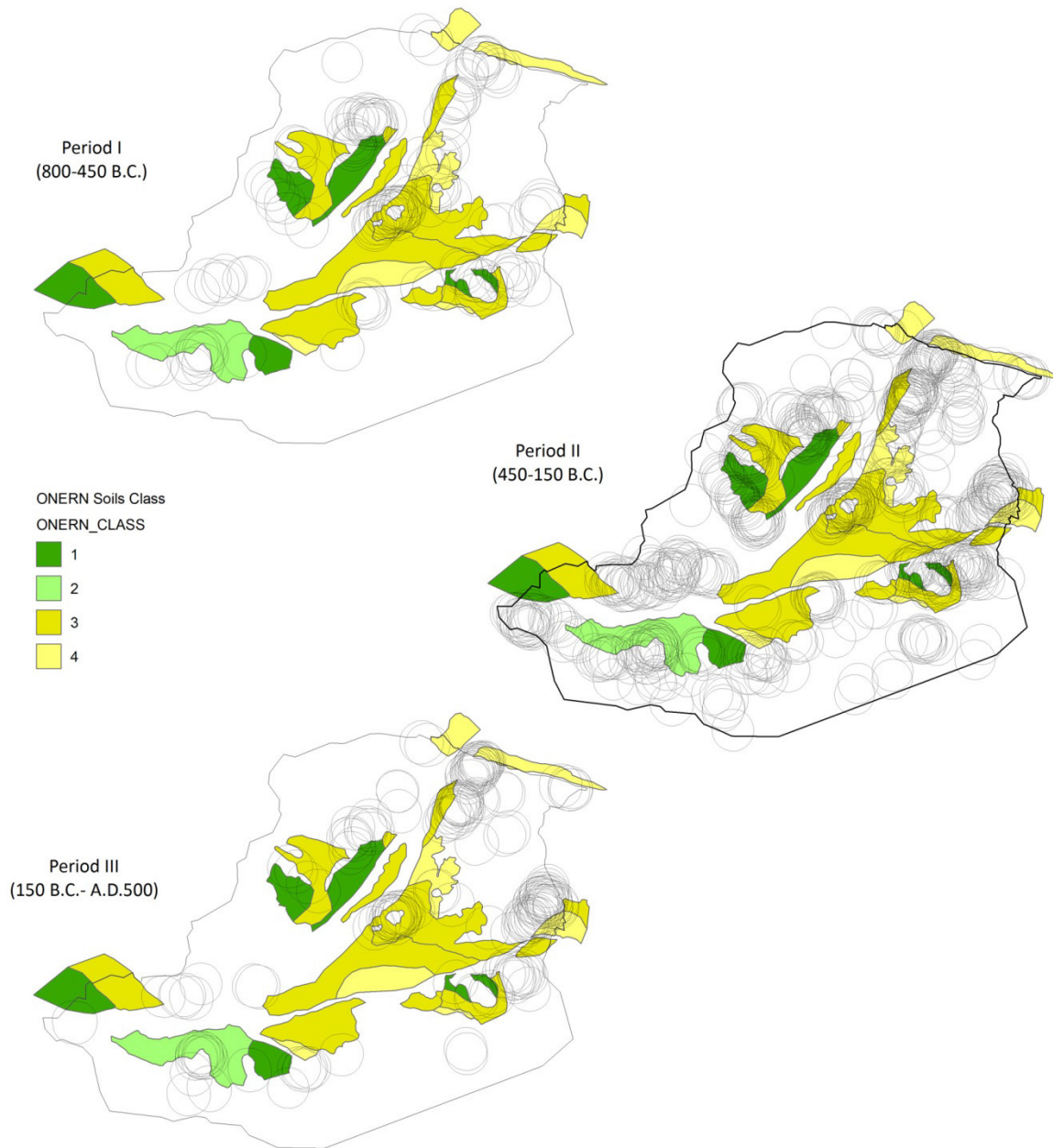


Figure 7-5 Maps with 500 meters buffers around a selected sample of households by period.

7.3.1 Leaders and Prime Soils

Inside each catchment, the area of each soil class and its proportion was calculated. Because some survey units are located at the edges of the survey zone, their catchments cover territory outside the unit's limits. To solve this problem, extra terrain was classified up to 500-600 meters beyond the survey boundaries. Then, ranks were compared by each soil class proportions at error ranges of 80, 95 and 99% confidence levels. A complementary analysis was made comparing the higher ranked households as one group (Rank 1-3) versus the lower ranked ones (Rank 4).

During Period I (Figure 7-6), the best soil is absent in Rank 1 households catchments, but it is more ubiquitous in the catchments of Rank 2 and 3 households than in those of Rank 4. While there is less than a 1% chance that the mean of proportion for Rank 2 and Rank 3 households are similar to the mean of Rank 4, the comparison in the other direction has more than a 20% chance of being similar. In addition, the strength of the differences with the mean proportion of Rank 4 households are very small (-5% with Rank 2 and -3% with Rank 3). In Rank 1 and Rank 2 household catchments, Class 3 soils are abundant, but the difference with Rank 4 households are not very strong (+5 and +2% respectively).

If households of Rank 1, 2 and 3, are aggregated in the "higher ranked household" category (Figure 7-7) and compare to those of Rank 4 as "lower ranked households," the difference of proportion of prime soil (Class 1) is only +3% and the significance of the difference is between 0.05 and 0.01. Class 2 soils are almost always associated with lower ranked households, while Class 3 and 4 soils dominate in the catchments of both groups, mirroring their natural abundance (Table 7-1). In sum, for Period I, there is only a weak association between higher ranked household and good soils. The general tendency is that higher and lower ranked households have very similar distribution of soils of different qualities.

For Period II (Figure 7-8), catchments of Rank 1 households have moderate differences of proportions of Class 1 and 2 soils in comparison with other households. For the proportions of Class 1 soils, the differences are between 8 and 6%, and are very significant when compared with Rank 3 and 4 ($p < 0.01$). However, because only Rank 1 households have a clear preference for best soils, and Rank 2 and 3 have no significant difference with Rank 4, when they are aggregated as "higher ranked households", there is no strong or very significant difference from lower ranked ones (Figure 7-9).

For the Period III (Figure 7-10), the catchments of Rank 4 households have lower proportions of prime soil than Rank 1 and Rank 3 households, but the differences are very small (+1 and +2% respectively). Rank 2 catchments lack any Class 1 or 2 soils, and in Rank 3, the Class 2 proportion is higher than for Rank 4 households, but the difference is again small (+5%). When higher ranked households are

aggregated as one group, there is no strong differences in prime soils availability in comparison with lower ranked households (Figure 7-11).

In sum, in none of the three periods do higher ranked households have greater association or access to the best soils in the survey zone. Only some households categorized as Rank 1 during Period II, show a preferential access to good soils in comparison to other households in the area. This tendency did not continue during Period III, when households of different ranks have almost similar access to prime soils.

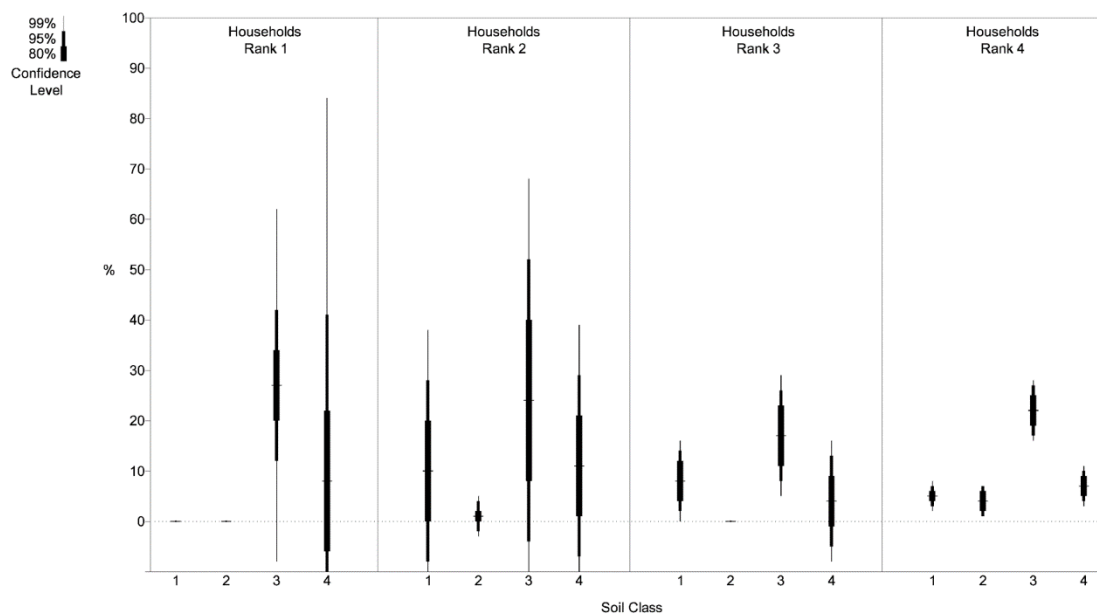


Figure 7-6 Comparison with bullet graphs of soil classes proportions inside catchments of households by rank during Period I.

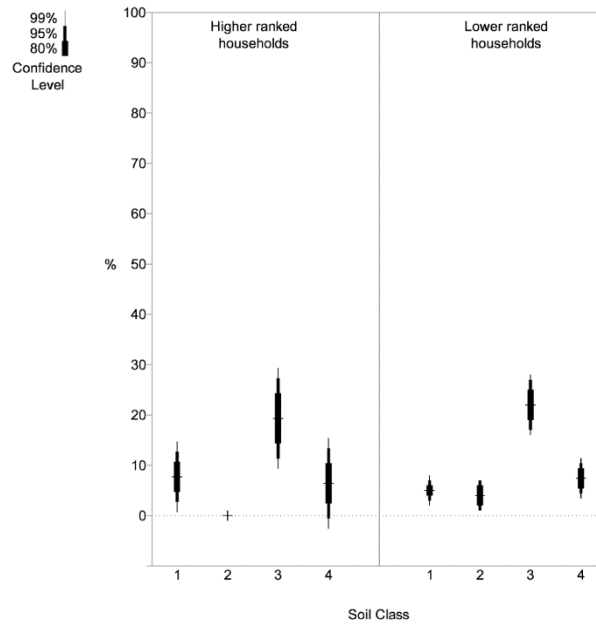


Figure 7-7 Comparison with bullet graphs of soil classes proportions inside catchments of households by aggregated rank during Period I.

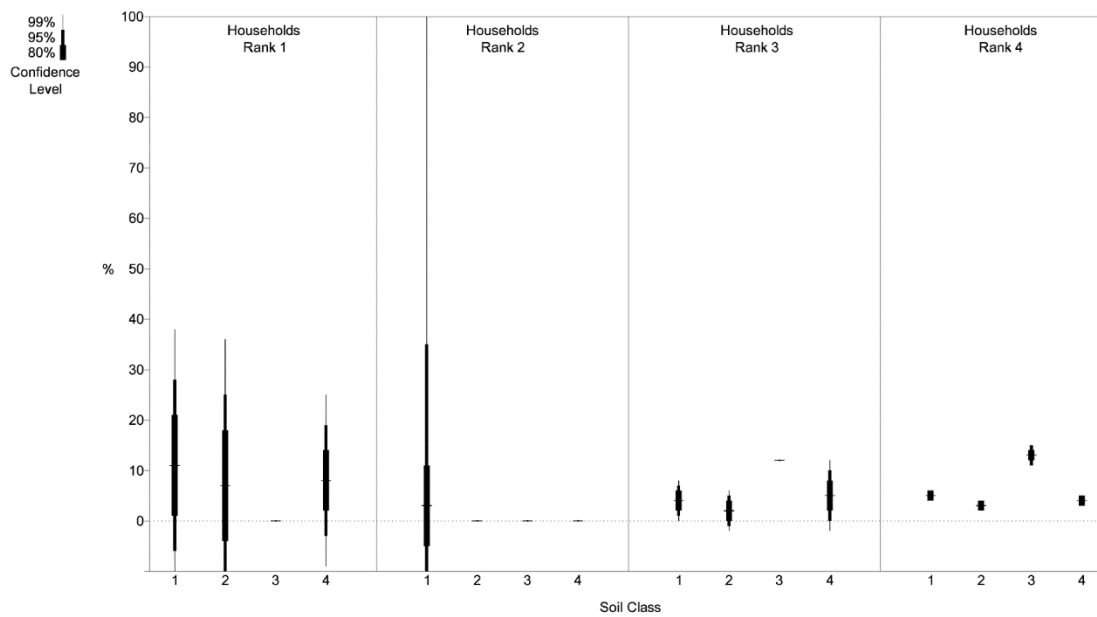


Figure 7-8 Comparison with bullet graphs of soil classes proportions inside catchments of households by rank during Period II.

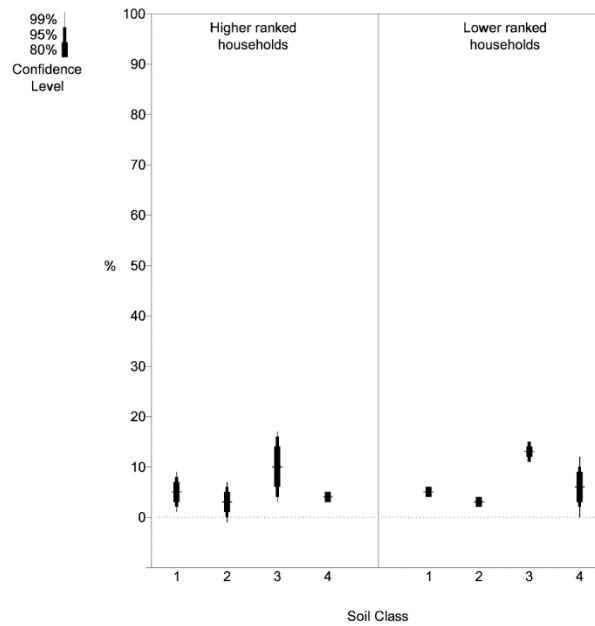


Figure 7-9 Comparison with bullet graphs of soil classes proportions inside catchments of households by aggregated rank during Period II.

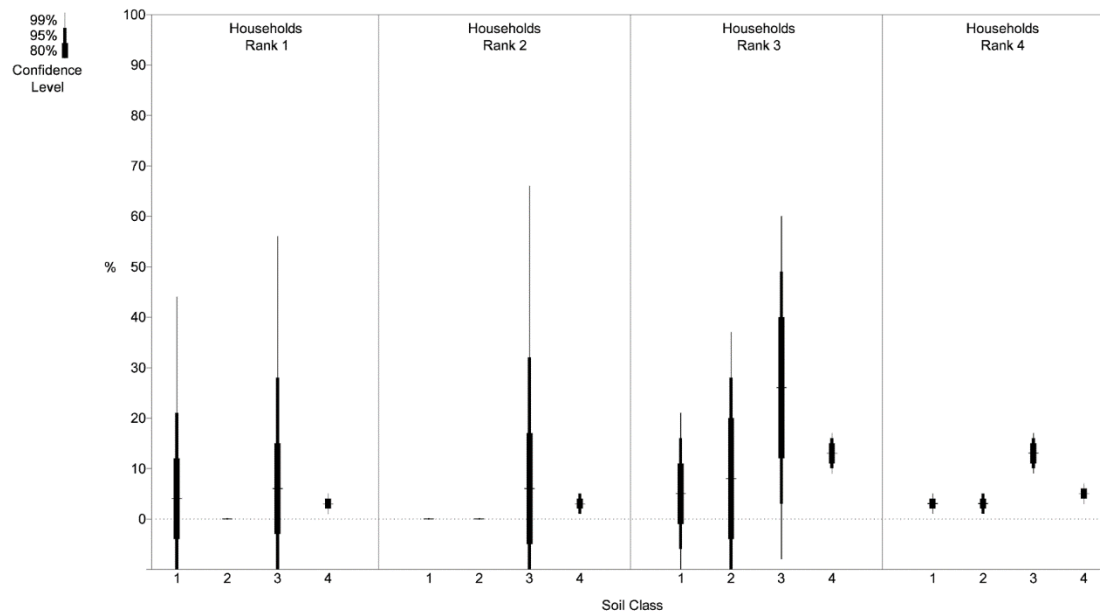


Figure 7-10 Comparison with bullet graphs of soil classes proportions inside catchments of households by rank during Period III.

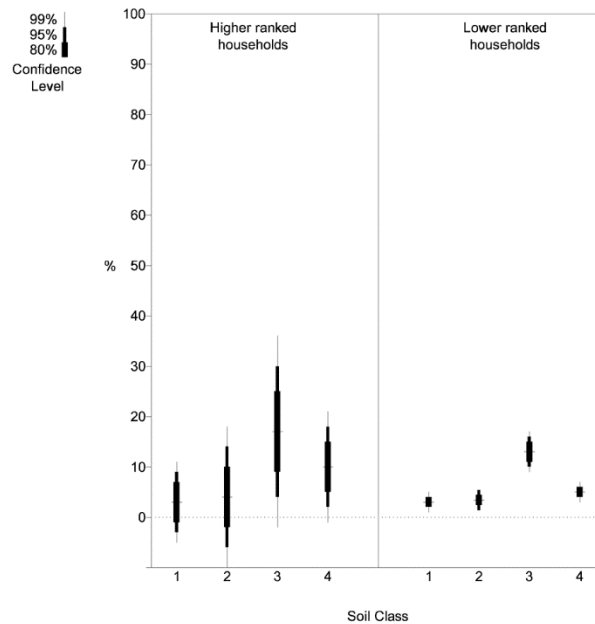


Figure 7-11 Comparison with bullet graphs of soil classes proportions inside catchments of households by aggregated rank during Period III.

7.3.2 Leaders and Relative Agricultural Potential

An alternative analysis was made comparing not the relative quality of the soils in the catchments, but the relative potential of all the land in their catchments. What if the development of authority and power relations is related not to access to patches of prime soils, but to the overall productivity of all available soils combined? For such purpose I approximated the relative potential of each soil, assigning values (Table 7-5) for each limitation identified by the ONERN report. Next, the relative productivity of each soil was approximated by dividing the sum of limitations of the best soil in the area by the total limitation value obtained for each soil (Table 7-6). If a soil has similar limitation values to the best soil, the productivity will be similar for the same amount of land of the best soil (100% or 1.0) In contrast, if the limitation values of a soil is 4 times the cumulative limitation value of the best soil, its productivity will be 25% or 0.25 of it.

Table 7-5 Table of assigned values for each limiting factor of soil productivity.

Depth		Drainage		Permeability	
Range (cm)	Value	Degree	Value	Degree	Value
< 20	2	Very Poor	3	Slow	4
20-80	1	Poor	2	Moderately slow	3
+ 80	0	Imperfect	1	Moderate	2
-	-	Good	0	Moderately fast	1
-	-	Fairly Excessive	1	Fast	0
-	-	Excessive	2	-	-

Table 7-5 (cont.)

Erosion Risk		Salinity		Fertility	
Degree	Value	Degree	Value	Degree	Value
None	0	None	0	Low	3
Low	1	Low	1	Medium	2
Moderate	2	Moderate	2	Good	1
-	-	High	3	High	0

Table 7-6 Relative soil productivity based in their cumulative limitations

Soil	Limitation values							ONERN (1972) Soil Class	Relative Productivity considering limitations
	Depth	Drainage	Permea- bility	Erosion Risk	Salinity	Fertility	Sum Total		
LC	0	0	2	0.5	0	1	3.5	1	1.00
PL	0	1	1	1	0	1	4	2	0.88
MO	1	1	1	1	0	2	6	3	0.58
RI	1	1	1	1.5	0	2	6.5	3	0.54
LD	1	0	2	1	0	3	7	4	0.50
RI-p	1	1	1	1.5	0	3	7.5	4	0.47
PI	2	2	0.5	1	0	3	8.5	4	0.41
RW	-	-	-	-	-	-	-	6	0.00
M	-	-	-	-	-	-	-	6	0.00

The area of each soil in each catchment (Figure 7-5) was multiplied by its productivity providing new figures measured as equivalent areas in prime soil, which was used as a proxy of the absolute potential of the land under consideration. To compare the land endowments of the catchment zones of households of different rank, the mean of the potential, as equivalent area of the best soil, and error

ranges at 80, 95 and 99 confidence level were obtained. The results (Figure 7-12) show that during the Period I, lower ranked households had, in average, lands with slightly more combined agricultural potential. However, there is moderate to high chance (more than 20% in some comparisons) that catchments indeed had similar values despite household rank.

During Period II, Rank 1 households had, on average, more combined agricultural potential than the households of other ranks. The difference is moderate (around 6 and 4 hectares than Rank 3 and 4 respectively) and highly significant ($p < 0.05$). This means, that although that Rank 1 households were not disproportionately associated with the prime soils, they had access to lands in which the combination of soils and their respective productivity were higher than those available for the rest of the population. However there is still more than 20% chance that Rank 3 and Rank 4 households have similar estimates as Rank 1 households.

During Period III, catchments of Rank 3 and 4 households had more agricultural potential than the equivalent Rank 1 and 2 households. In the case of Rank 3 households, the difference is strong (more than 20%) and highly significant, while for Rank 4, the values are slightly higher (more than 4 ha of difference) and moderately to highly significant.

When higher ranked households are analyzed as a group and compared with lower ranked households (Figure 7-13) the results show that for Period I and Period II, lower ranked household had access to lands with slightly larger combined agricultural potential, but chances are higher than 20% that indeed they have similar values than higher ranked households. In case of Period III, higher ranked households had more combined agricultural potential than lower ranked households. The difference which is strong (around 7 ha) and highly significant ($p < 0.01$), is caused by the high values seen in the Rank 3 households (Figure 7-12)

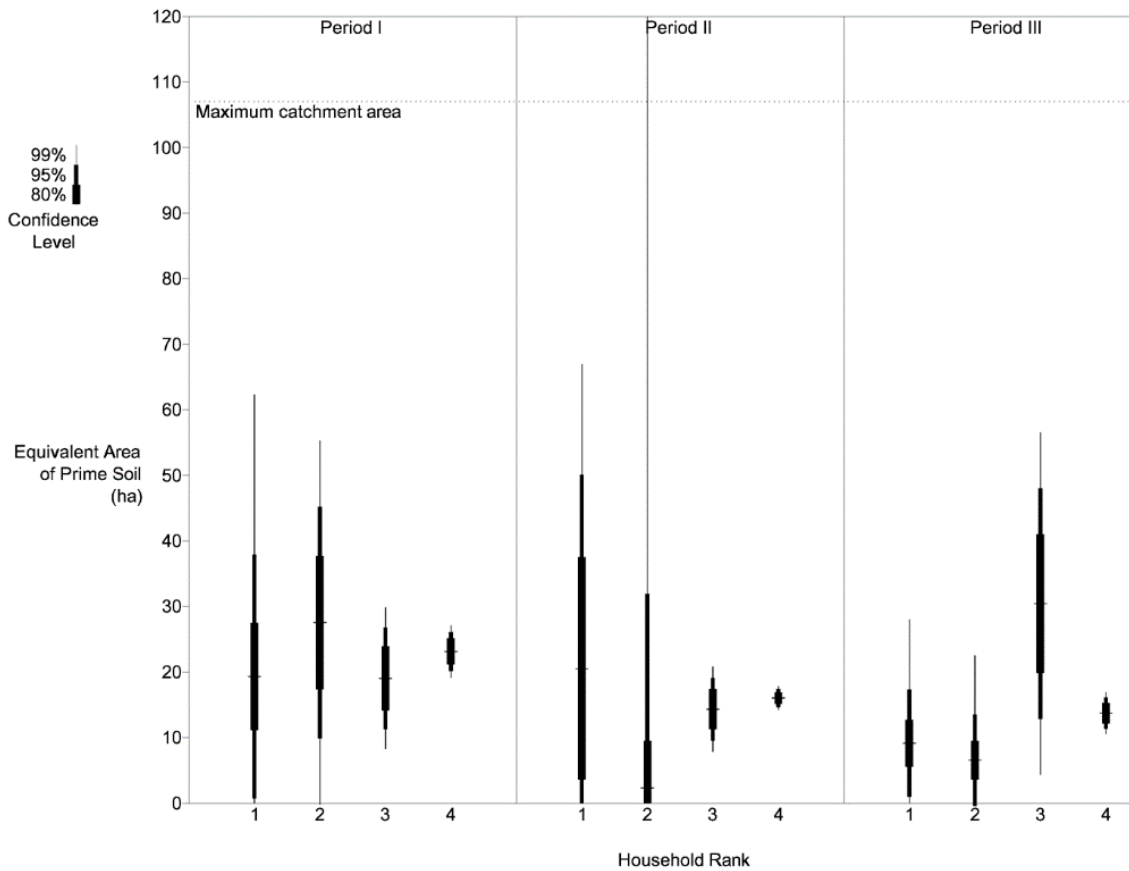


Figure 7-12 Comparison with bullet graphs of the mean agricultural potential, estimated as area of equivalent prime soil (ha), of the catchment zones of households by rank and period.

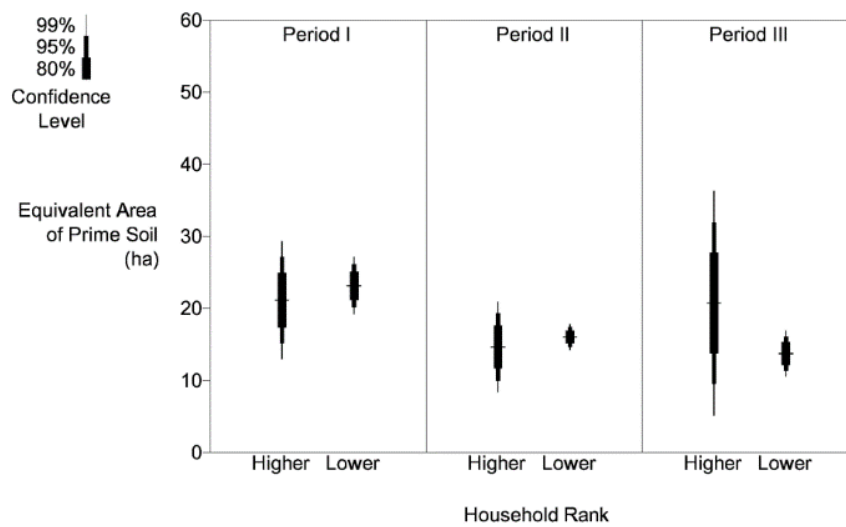


Figure 7-13 Bullet graphs of the mean agricultural potential, estimated as area of equivalent prime soil (ha), of the catchment zones of households by aggregated rank and period.

7.3.3 Irrigation Systems, Districts and Leaders

Keeping in mind the caveats about the identification of ancient irrigation systems and their antiquity, the critical role of water in the Peruvian desert coast encouraged me to carry out a rough exploration with the available fragmented information.

The Moro Pocket can be divided into three sections that could be each be irrigated by an independent system (Figure 7-14). The sector at the righthand margin of the Nepeña River, the Northern Lands, includes the cultivable area around Motocachy and San Juan towns. Irrigation systems for this area must follow a NE-W-SW direction with water intakes coming from the zone where the riverine zone reaches between 500 and 600 masl, between the San Juan and Captuy towns. This irrigation system must have involved the collaboration between households along its route, and any potential control over the system would have been possible by controlling the main canals or intakes upriver.

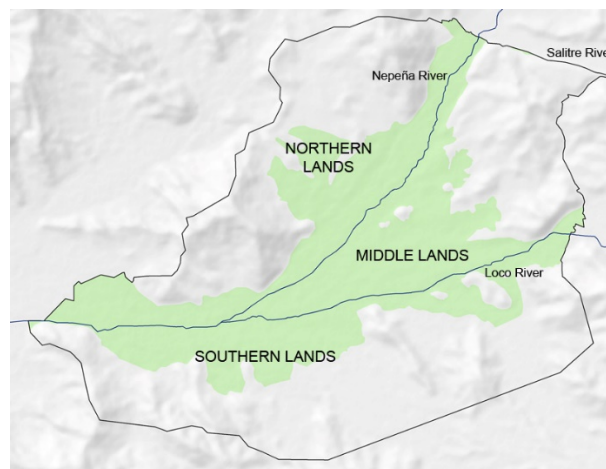


Figure 7-14 Suggested division of land according to hypothetical independent irrigation systems.

The second sector, the Middle Lands, corresponds to the area between the Nepeña River and Loco River, and includes the area surrounding Moro and Paredones towns, as well as the slopes between Buenavista and Moro Nuevo. These lands can be irrigated by irrigation systems with intakes from either the Salitre River or the Nepeña River in its south margin, but at altitudes higher than 600 masl, outside the survey boundaries. The main canals would have traversed the slopes next to Kushipampa and Huancarpón in the North, and some sections of it are still visible in the present. An alternative could have been canals drawing water from the Loco River, with intakes either in the portion where the river touch the Chacuas Cucho hill or upriver. As with the Northern Lands, households next to the main canals and

intakes upriver could have controlled the whole system. Household located in lower elevations would have been dependent on those upstream.

The third sector, the Southern Lands, is located to the west of the Loco River. The flat and sedimentary alluvial terrain that characterize this sector would have impeded an adequate maintenance of intakes in lower elevations during the summer, when the river usually floods the surrounding lands, and the intakes must have been in the area of Pocós. In order to irrigate lands in lower elevations, the canals would need to have followed a path down the slope of the hills located to the south, and any control could have been exercised only by households located upriver.

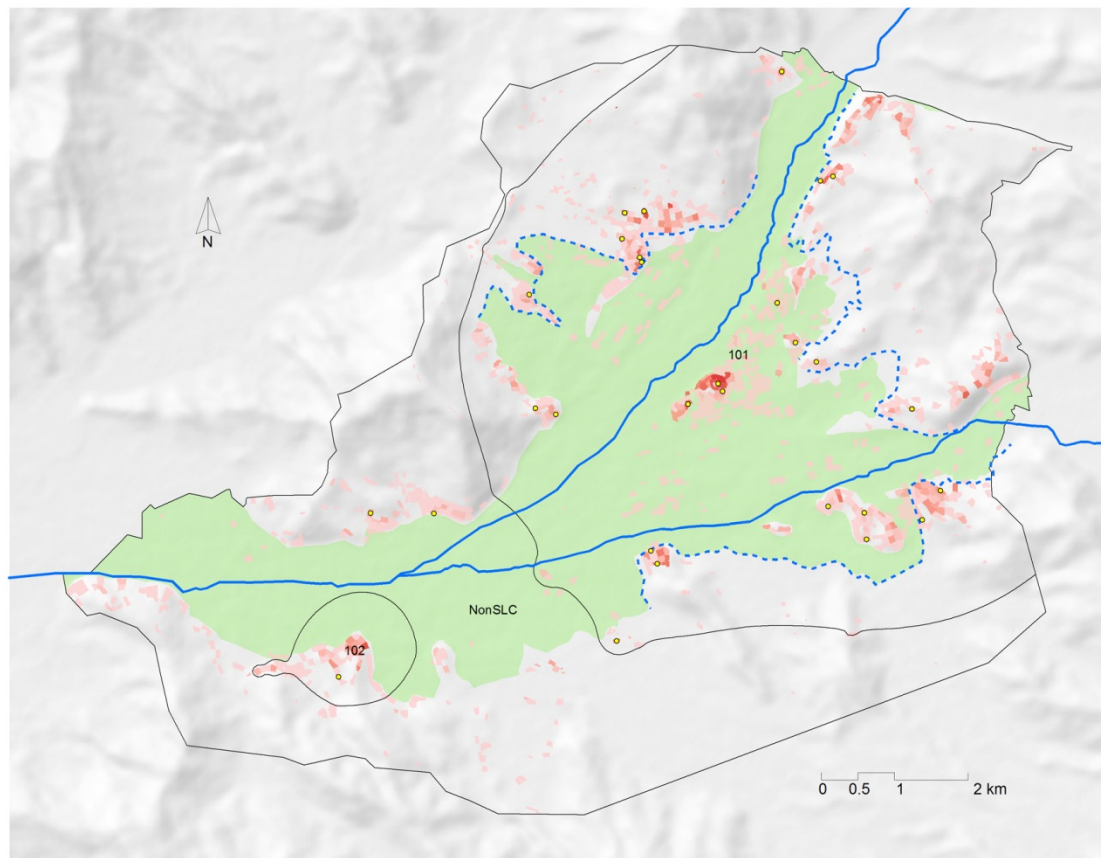


Figure 7-15 Suggested path of irrigation canals (dashed blue), cultivable lands (green), population density (red) and higher ranked households (yellow dots) during Period I.

During Period I (Figure 7-15), households were mainly located in the middle of the cultivable zone, and many of the affluent households were located in these population clusters. In short, people were settled close to, but not always in, the garden plots and it was not detected in the analysis any sign to control the main canals in either sector. The U-temple (see Chapter 8.0) was located near the suggested path of the canal and just before its waters reach the wider portion of the Moro Pocket. In

addition, the natural water upwelling or springs next to the San Isidro hill may have proportionate moist for nearby gardens and reduce the dependence of these families to the artificial irrigation system.

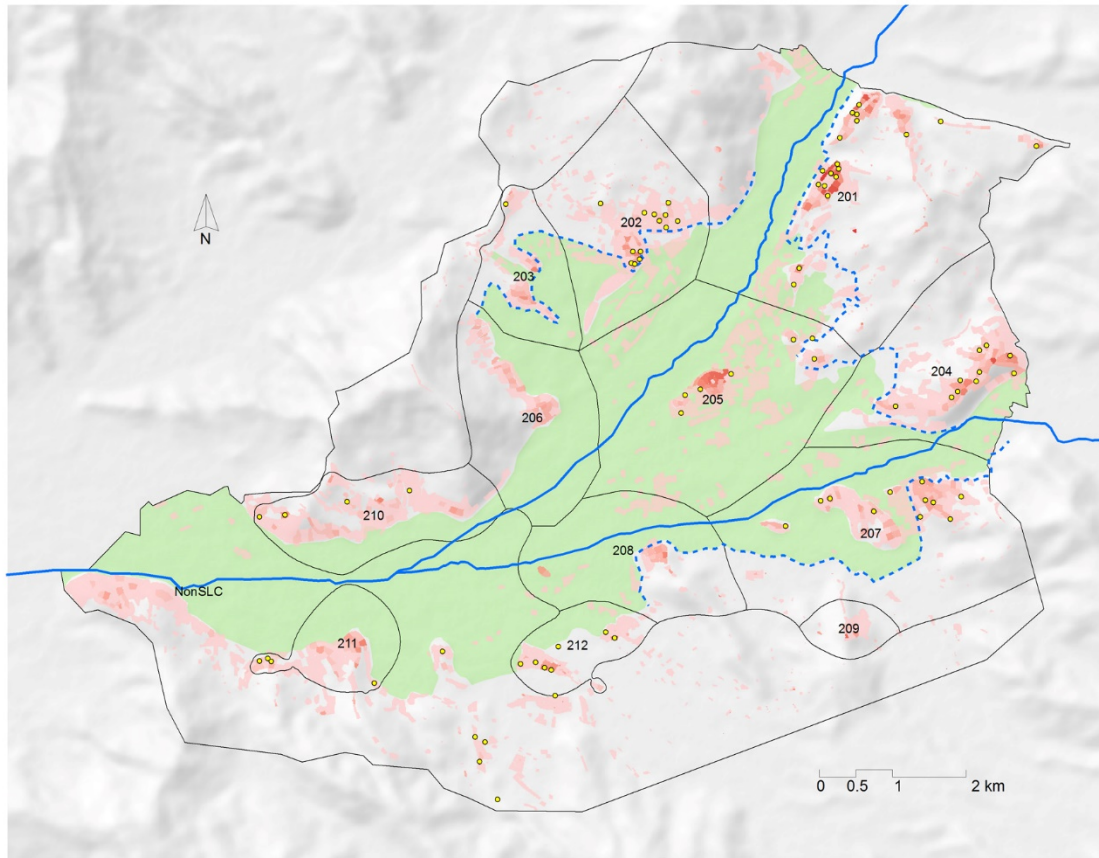


Figure 7-16 Suggested path of irrigation canals (dashed blue), cultivable lands (green), population density (red) and higher ranked households (yellow dots) during Period II.

During Period II (Figure 7-16), despite the fragmentation of the demographic landscape, the irrigation systems must have condition the way several districts related with each other. The Northern Lands was distributed mainly between SLC 201, 202, 203 and 206, however only SLC 201 and 202 must have been capable to exercise control over the system. Indeed, as it will see in Chapter 9.0 , a system of fortresses were built surrounding Kushipampa in SLC 201, and in the northern margin of the Nepeña River, several of them may have overlooked the canal path. The demographic center of SLC 202, and its ceremonial center was located immediately above the suggested path of the canal, and controlling the distribution of water to the households in SLC 203, 206 and potentially 210. In this side of the river, SLC 202 is the district with most of the higher ranked households of the sector.

The Middle Lands was divided between SLC 201, 204 and 205. Two potential systems could have been built, one with intakes in the Nepeña River, and the other in the Loco River. However, the Nepeña

River have more stable and predictable cycle, and until today is the main source of water for most of the Moro Pocket. In such case, and if spring water was not enough, the district of SLC 201 must have find an opportunity for domination by the control of the water canals. In fact, SLC 201 was the district with the largest portion of higher ranked households in this sector.

The Southern Lands, with its potentially independent system, must have stay autonomous to any control from SLC 201, but SLC 207, the largest district in the sector, could have taken advantage of it. However, the irregularity of the Loco River flow, must have been an impediment for a long-term development of a hierarchical relationship with its neighbors. Cyclical floods or the rise of the water table must have proportionated enough moist in the alluvial terrain to sustain agricultural activities during the summer season. In fact, SLC 207 did not concentrated the higher ranked households in this sector, but SLC 212, a district surrounded by large patches of cultivable soil.

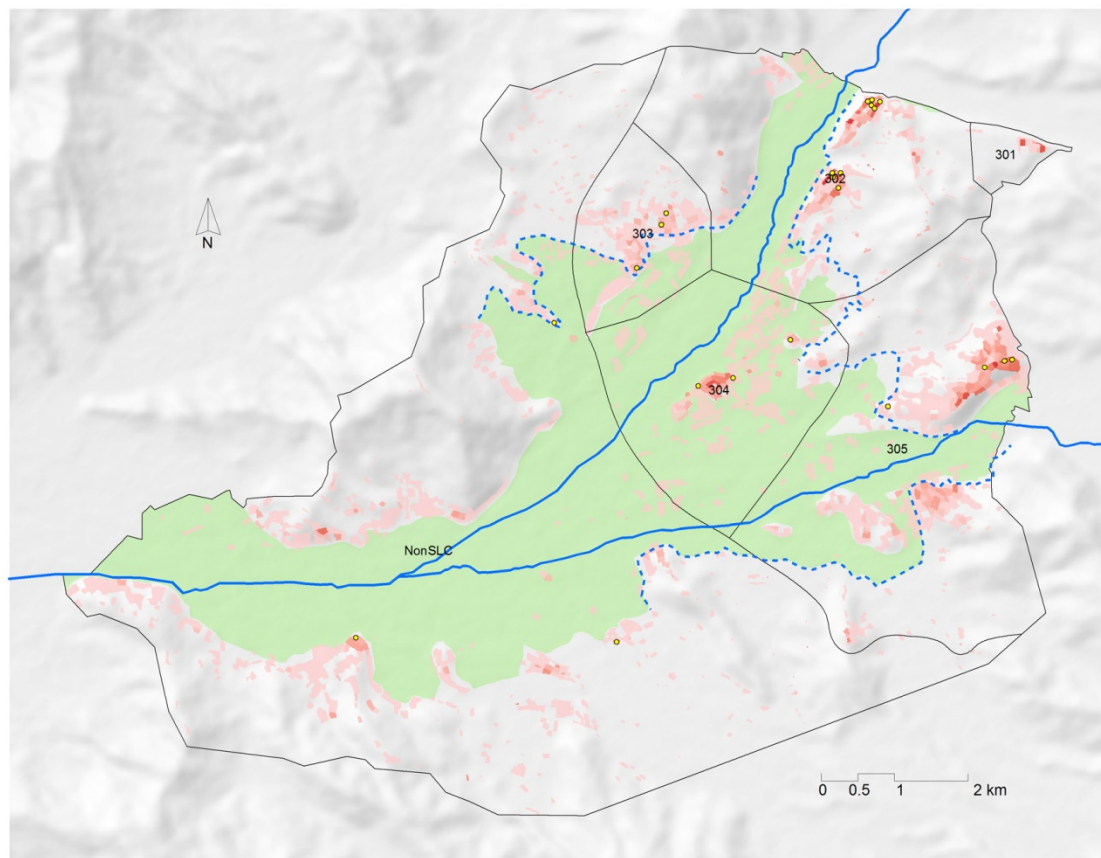


Figure 7-17 Suggested path of irrigation canals (dashed blue), cultivable lands (green), population density (red) and higher ranked households (yellow dots) during Period III.

Finally during Period III (Figure 7-17), the two major districts, SLC 302 and 305 were in strategic locations from where the whole irrigation system of the Middle Valley would have been controlled. Indeed, higher ranked households were mainly identified in areas close to the inferred path of this main water canals.

7.4 SUMMARY AND INTERPRETATIONS

Soils in the survey zone exhibit a heterogeneous distribution, while most of the land cannot be cultivated because of poor soil quality and/or the lack of water availability. Between the Late Formative (Period I) to the Early Intermediate Period (Period III), most of the households were on relatively barren land, but in close proximity to arable lands. This produces a settlement pattern recognizable in other Peruvian coastal valleys, where pre-Hispanic populations settled at the edges of the cultivable zone, probably as a way to maximize its area. However other variables, such as warfare (see Chapter 9.0), may have played important roles in settlement here in Period II.

Soils with high agricultural potential exist in the survey zone, but they are scattered. The several analyses I carried out did not reveal a clear correlation between soil quality and household rank in any of the three periods under study. Indeed, the results show broadly that households had similar access to similar soils despite their rank. This is an indicator that everybody may have been engaged in agricultural activity, and that domination of agricultural production was not a means to develop social inequality among households.

One of my attempts to compare house rank to absolute productivity of the land shows a moderate advantage for highest ranked households (Rank 1) for the Final Formative (Period II). However, the results are not reliable because of the small sample size (N=6). For Period III, if we combine Rank 1 and 2 households, there is a clear difference with higher productivity for these higher ranked households. However, the difference of 7 ha is only moderate, considering the size of the catchments (between 87 and 107 ha) used for the comparative task.

An interesting observation is that even during the Final Formative (Period II), when population peaked, growing rapidly from the previous period, and reducing the available land per capita, there were only minimal signs of attempts to control cultivable land. One possible explanation is that land was not individually managed by households but controlled by larger social units. In such case, leaders should not correlate with land, but with clusters of households, because the agricultural potential should be

measured as the amount of labor available, and not by the land around leaders' households. This spatial correlation between population concentration and leadership households was a trend described in Chapter 5.0 .

A somewhat different perspective is afforded from examining the relationship between the inferred artificial irrigation systems, district boundaries, and loci of leaders. During Period I, there is no strong evidence to argue in favor of any kind of control over an irrigation system. During Period II, the balkanization of the survey zone into a dozen supra-local communities created new opportunities to exercise dominance by the control over irrigation systems. Analysis suggests a correlation in several of the districts between access to the main water canals and intakes and the abundance of high ranked households. This association is valid for the Northern and Middle Lands, but not for the Southern Lands, which depended on the unpredictable Loco River.

During Period III, this trend consolidated and the two major districts, with most of the higher ranked households, emerged in those areas where the control over the irrigation systems was most feasible. If these households were controlling irrigation, it would have created a situation in which the rest of households in the Moro Pocket were dependent on them. These associations point to some leaders during the Period II, and the majority of them during Period III, having potentially built power or leadership on controlling access to irrigation.

In sum, analysis suggests that access to, or even dominance of, irrigation water (rather than arable soil) was a critical factor in leadership in the survey zone. The analysis of agricultural potential indicates that: a) the higher ranked household of Period III had slightly better access to better lands; and b) people were living outside of their fields; and c) lands may have been corporately managed. While in the Late Formative (Period I), the evidence suggest no attempts were made to control irrigation systems, during the Final Formative (Period II) and Early Intermediate (Period III), these irrigation systems were important in integration or cooperation among districts, and also provided leaders with a tool to exercise power at a regional scale. The degree of cooperation and dominance would have been in direct relation to the predictability of, and reliance on, the water supply these systems provided. In contrast, the potential irrigation systems of the Southern Lands could not have provided an effective tool to integrate communities, or to empower leaders beyond the boundaries of their own districts.

8.0 CEREMONIAL ARCHITECTURE, RITUAL PRACTICES AND POWER

Public centers are the most tangible manifestation of leadership in the archaeological record. As loci for communal ritual practices and charged social interaction, they would have been places for social integration, as well as arenas in which social relations were reproduced, and social boundaries and inequalities demarcated and highlighted. Thus analysis of ceremonial centers provides insights into religious aspects of leadership and power relations that are not necessarily visible in other aspects of the community, either because they are sporadic, or because they do not translate into improved living conditions for leaders. For instance, some power strategies involving labor mobilization, because they are mainly spent on public works and not to a leader's economic benefit, are difficult to see at the household level in the archaeological record (Blanton, et al. 1996). Overall, the characteristics of the public architecture could serve as indicators of how communities integrated, how communities were divided, and how power was exercised during ritual practices, including monument building (Moore 1996c).

The goal of this chapter is to explore what centers in the survey zone reveal about leadership(s) through time. I identified as ceremonial centers those places where community-wide ritual practices were carried out. This practice entails open spaces for people to congregate. The size and number of such open spaces is revealing for ceremonial centers, but open spaces are also found in monumental architecture of a different nature, such as fortresses. If a fortress had a large open area, it could have been used for ritual purposes in addition to its defensive role. For purposes of this analysis, only spaces of at least 150 m² were classified as "open," because it would have been difficult to roof spaces larger than this. While smaller areas (open or roofed) in the centers were no doubt used for ritual purposes, it is likely these were used by household or local populations, and did not have as direct a supra-local role as larger spaces. For comparative purposes, the ceremonial centers that would have gathered the largest audiences (i.e., largest plaza areas) from each district have been selected for comparison (Table 8-1). Sketches and photographs of the public architecture with descriptions of the megalithic construction, the location of plazas, and the topography are presented in the Appendix D.

Table 8-1 Major Ceremonial Centers Analyzed in this Chapter

Period	District	Site Code (Proulx&Daggett)	Site Name
I	101	PV31-226	Nuevo Moro 4*
I/II	201	-	El Algarrobal 4*
I/II	202	PV31-47	San Juan
I/II	205	PV31-64	Paredones
I/II	207	PV31-170	Anta
I/II	211	-	Quisque Bajo
I/II	non-SLC	PV31-351	Virahuanca Bajo South
I/II	non-SLC	PV31-46	Complejo Quisque*
II	201	PV31-56	Kushipampa
II	202	PV31-48	El Molino-Motocachi
II	203	PV31-330	Cerro Motocachi 17*
II	204	PV31-179	Cerro Chacuas Cucho 5*
II	205	PV31-51	Cerro San Isidro
II	206	PV31-63	Cerro Motocachi 8*
II	207	PV31-166/8	Vinchamarca
II	208	PV31-344/5	Virahuanca Cerro
II	210	-	Cerro Pimpon 3*
II	211	PV31-312	Quisque Bajo
II	212	PV31-351	Virahuanca Bajo North
II	non-SLC	-	Complejo Quisque*
II	non-SLC	PV31-326	Virahuanca Alto
III	302	PV31-59	Huancarpón
III	305	PV31-184/5	Chacuas Cucho 1*

Note: * Name given during this project.

As described in Chapter 3.0 , in this research I avoided having to delineate archaeological sites, because drawing boundaries for sites is problematic. This observation is also valid in this section. To delimit a ceremonial site would require identifying their edges. However, as it will be described in this section, many of the ceremonial centers were part of larger complexes including plazas, mounds, residential areas, and even non-architectural features (i.e. petroglyphs). The way ceremonial centers were analyzed allowed me to identify sections of these settlements that were occupied at different moments, or as it will be described later, abandoned before completion. Public architecture can be studied from many perspectives, but in this case I am going to focus on comparing these centers in terms of location, function, potential users, and stylistic variability.

The ceramic chronology makes it possible to subdivide the time between 800 B.C. and A.D. 500 into three different periods. However, there was a trans-period time, between the abandonment of ceremonial centers in Period I, and the consolidation of Period II centers, in which construction on several ceremonial centers was begun but never finished. Evidence for this includes (Figure 8-1): a) walls and layout only delineated by one row of cut-stones; b) areas with dispersed unused cut-stones; c) extremely

low densities of surface artifacts; and/or d) mounds and platforms with incomplete filling. Some other buildings, as for instance at Quisque, even show evidence of hasty attempts to complete the original project, and the completion of walls with expedited construction techniques (Figure 8-1: d). This set of unfinished buildings is very important to understand and study the reaction of people and their leaders to the crisis generated by the disintegration of the Cupisnique-Chavín Religious Complex, and in consequence, I analyze them separately as the transitional Period I/II.



Figure 8-1 Archaeological evidence of unfinished buildings in the survey zone: San Juan (a), Anta (b), Virahuanca Bajo South (c), and Quisque (d). This last one shows the abandonment of the original megalithic architecture project and the use of expedient walls, including a tower (in the picture).

8.1 LOCATION OF THE CEREMONIAL CENTERS

I begin by comparing the location of the ceremonial centers in terms of topographical settings and relationship with the population distribution. The latter involves the comparison of the spatial correlation of the ceremonial centers and the demographic centers in each district, which was carried out identifying in which of rings used in the centralization analysis (Chapter 5.0) the center is located. If centers were in the demographic centers, they should be located in the ring 1. In contrast, further their location are, higher the number of the ring. If centers are located in the ring 12 it means that they were built at the edges of the districts. Because districts, and therefore the rings, are of different size, it is necessary also the analysis of maps.

The results (Table 8-2, Figure 8-2) indicate that the only ceremonial center identified for Period I was located in the valley floor (Figure 8-3), in a slightly sloping terrain. This ceremonial center is found in the ring 2, in a zone of low residential density, and around 1.5 km northeast from the demographic center of SLC 101.

During the transitional Period I/II, the new ceremonial centers projects were also located in flat terrain, far from the demographic centers, and generally in zones of low residential density. The only exception is Quisque which was a fortress built in the slope of the hill, facing the valley, and surrounded by a population cluster. These Period I and Period I/II ceremonial centers –with the exception of Quisque– were built in places with easy accessibility and not attached to any population cluster.

During Period II (Figure 8-4), the situation changed radically and all the new ceremonial centers were found in or near to dense residential areas. Some of them were built in the demographic centers of the districts (SLC 201, 202, 205, 206, 208, and 211) or in towns outside the districts (Virahuanca Alto and Complejo Quisque). In SLC 212, the ceremonial center was adjacent to the demographic center; while in others they were located in secondary population clusters (SLC 203, 204, 207, and 210). Almost all the ceremonial centers were found in very defensive locations such as hilltops and slopes, with the only exception of Virahuanca Bajo North. This last one was built in a dry alluvial fan or pampa, permitting a relatively easy access from the neighboring settlements.

Finally during Period III (Figure 8-5), only two ceremonial centers can be found in the survey zone, and both were located in hilltops, and both were highly integrated into their respective settlements, the demographic centers of SLC 302 and 305.

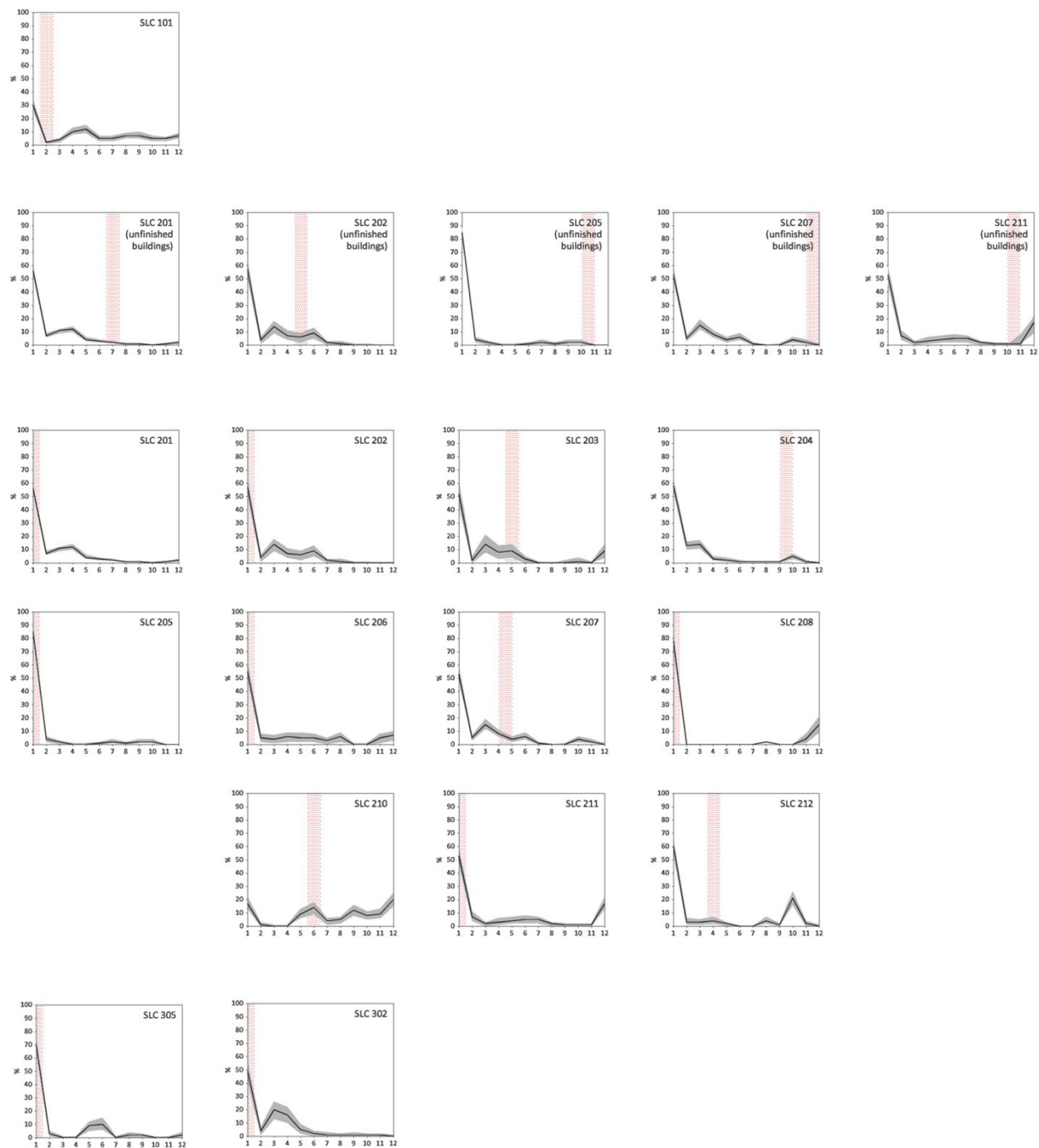


Figure 8-2 Correspondence between the location of ceremonial centers (red bar) and the demographic distribution in each district.

Table 8-2 Result of the analysis of spatial correlation between the ceremonial centers and the demographic centers.

Period	District	Site Name	Topography	Ring number
I	101	Nuevo Moro 4*	Valley Floor	2
I/II	201	El Algarrobal 4*	Pampa	7
I/II	202	San Juan	Pampa	5
I/II	205	Paredones	Valley Floor	10.5
I/II	207	Anta	Pampa	11.5
I/II	211	Quisque Bajo	Pampa	10.5
I/II	non-SLC	Virahuanca Bajo South	Pampa	-
I/II	non-SLC	Complejo Quisque*	Hill-slope	-
II	201	Kushipampa	Hilltop	1
II	202	El Molino-Motocachi	Hilltop	1
II	203	Cerro Motocachi 17*	Hill-slope	5
II	204	Cerro Chacuas Cucho 5*	Hilltop	9.5
II	205	Cerro San Isidro	Hilltop	1
II	206	Cerro Motocachi 8*	Hill-slope	1
II	207	Vinchamarca	Hill-slope	4.5
II	208	Virahuanca Cerro	Hilltop	1
II	210	Cerro Pimpon 3*	Hilltop	6
II	211	Quisque Bajo	Hilltop	1
II	212	Virahuanca Bajo North	Pampa	4
II	non-SLC	Complejo Quisque*	Hilltop	-
II	non-SLC	Virahuanca Alto	Hilltop	-
III	302	Huancarpón	Hilltop	1
III	305	Chacuas Cucho 1*	Hilltop	1

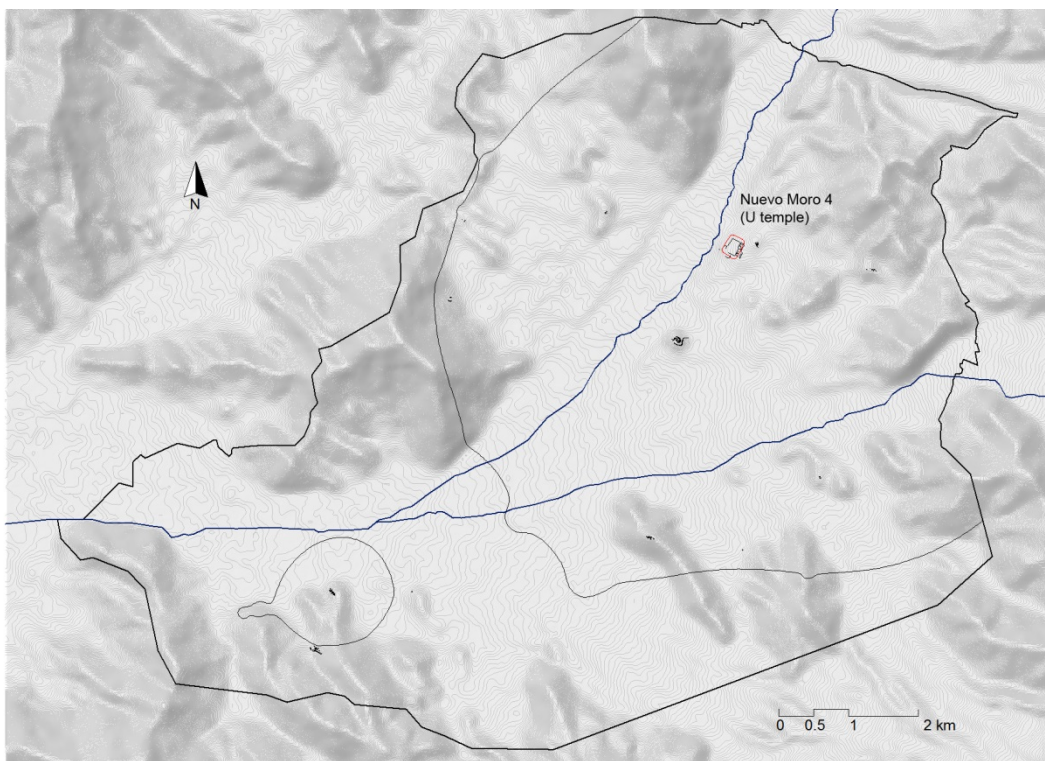


Figure 8-3 Map of the major ceremonial center of Period I (Red).

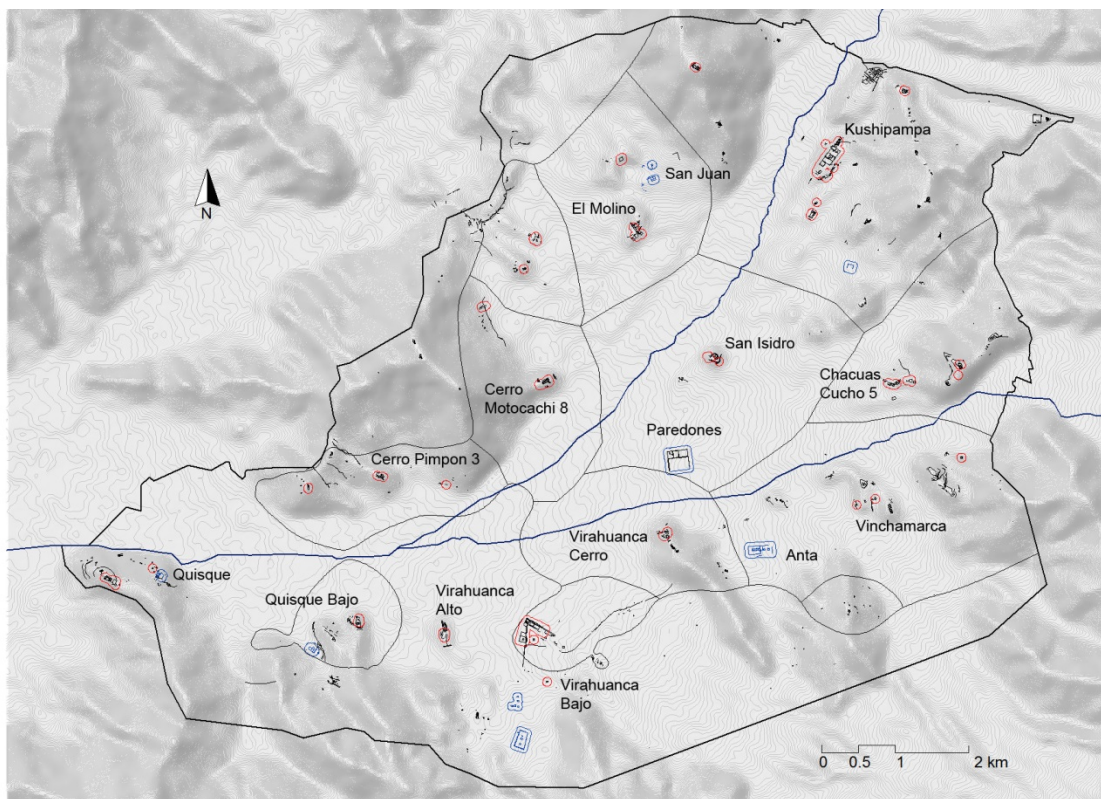


Figure 8-4 Map of the major ceremonial center of Period I/II (Blue) and Period II (Red).

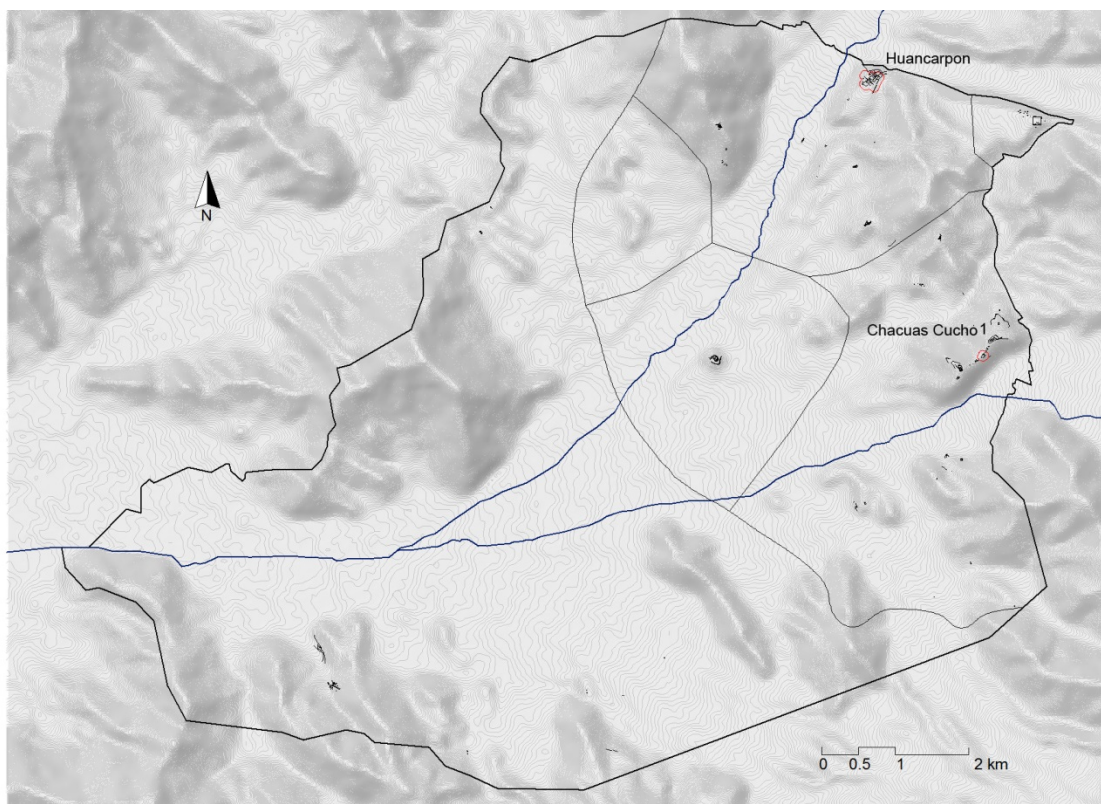


Figure 8-5 Map of the major ceremonial center of Period III (Red).

8.2 FUNCTIONAL CHARACTERISTICS OF PUBLIC SPACES

In this section I explored how public buildings were organized, how these structures may have been shaping ritual performances, and consequently, how communities were integrated or divided in such occasions. For this purpose, I analyze the pattern of accessibility to ritual spaces and the relationship between verticality and horizontality in the ceremonial center layout.

8.2.1 Relative Accessibility to Plazas

The relative accessibility of public spaces was approximated by identifying the number of thresholds that a potential visitor have to pass to reach the innermost plaza (not necessarily the largest one) in each ceremonial center (Table 8-3). The thresholds I identified were walls, dry moats or drastic changes in elevation (i.e. different platforms or terraces). If a public space have no physical boundaries it can be described as very open whether it is in flat terrain or in a hill. In contrast, if three or more different thresholds need to be crossed, I considered the access to the public space as very restricted. While a more detailed analysis (i.e. Moore 1996a) would be ideal, the lack of detailed architectural information is a serious limitation for such purpose.

Table 8-3 Classification of Relative Accessibility of Innermost Plaza

Accesibility	Thresholds crossed to reach innermost plaza	Example (in Error! Reference source not found.)
Very open	0	(1)
Open	1	(2) or (4)
Restricted	2	(3)
Very Restricted	3+	(7)

The results (Table 8-4) show a clear tendency toward higher levels of restriction through time. Dated to Period I, the ceremonial center of Nuevo Moro 4, a U-temple, does not have many identifiable features in surface. However, if this ceremonial complex is similar to many other U-temples of the North and Central Coast (Williams 1978), it should have almost no restriction of access to the main central plaza, located between the two “arms”. More intensive research with systematic excavations is required to have a better picture of the nature of this ceremonial center.

Because the buildings of Period I/II were not completed, or modified from the original plan, it was difficult to analyze the degree of depth of the plazas. With the few information available, it seems that many of them were designed to keep a relatively open access to the plazas. However, three of them started to show higher degrees of privacy. Two of them were San Juan and Paredones, which as it is discussed later, belong to the same architectural tradition of Kushipampa.

During Period II, almost all the major ceremonial centers in the survey zone had relatively high degrees of restriction to the innermost plazas. The only exception is Vinchamarca, which only has two enclosures, very small ones in comparison with the large fortress and the probably elite compound built in the top of the hill. This high degree of restriction, and the defensive location of most of these ritual spaces suggest an increased need of control over access to rituals.

Table 8-4 Results of the analysis of relative accessibility of public spaces in the major ceremonial centers.

Period	District	Site Name	Topography	Relative Accessibility to Innermost Plaza
I	101	Nuevo Moro 4*	Valley Floor	Very Open
I/II	201	El Algarrobal 4*	Pampa	Open?
I/II	202	San Juan	Pampa	Restricted
I/II	205	Paredones	Valley Floor	Very Restricted
I/II	207	Anta	Pampa	Restricted
I/II	211	Quisque Bajo	Pampa	Open
I/II	non-SLC	Virahuanca Bajo South	Pampa	Open
I/II	non-SLC	Complejo Quisque*	Hill-slope	Open
II	201	Kushipampa	Hilltop	Very Restricted
II	202	El Molino-Motocachi	Hilltop	Very Restricted
II	203	Cerro Motocachi 17*	Hill-slope	Restricted
II	204	Cerro Chacuas Cucho 5*	Hilltop	Very Restricted
II	205	Cerro San Isidro	Hilltop	Restricted/Very Restricted
II	206	Cerro Motocachi 8*	Hill-slope	Very Restricted
II	207	Vinchamarca	Hill-slope	Open
II	208	Virahuanca Cerro	Hilltop	Very Restricted
II	210	Cerro Pimpon 3*	Hilltop	Very Restricted
II	211	Quisque Bajo	Hilltop	Restricted
II	212	Virahuanca Bajo North	Pampa	Very Restricted
II	non-SLC	Complejo Quisque*	Hilltop	Very Restricted
II	non-SLC	Virahuanca Alto	Hilltop	Restricted
III	302	Huancarpón	Hilltop	Very Restricted
III	305	Chacuas Cucho 1*	Hilltop	Very Restricted

8.2.2 Horizontal versus Vertical Emphasis of Ritual Construction

The emphasis in vertical or horizontal construction is approximated by estimating the ratio between a meaningful horizontal measurement and a vertical one. These meaningful measurement refers to features that can be exploited or modified by human intervention: construction, choice of the location, excavation of the terrain, etc. In this section I use the length of the largest plaza as the horizontal value, while the difference between the top of the largest associated monument and the base of the closest plaza -not necessarily the largest one- is used as the vertical value (Figure 8-6). Because it is very likely that people in the past has taken advantage of natural topography (i.e. hills) to enhance the visibility, the elevation differences based in natural geological formations was also considered in the vertical value.

An emphasis in horizontal construction indicates the greater relative importance of the plazas and the ritual occurring in them, as have been suggested for Inka settlements (Moore 1996a). In contrast, a vertical emphasis may be related to either the increased height of the mounds, or the reduction of the scale of the plazas. In the first, it may indicate the importance of mound size, probably as the materialization of power (DeMarrais, et al. 1996), during ritual performances in the centers. In the second, it may indicate a diminished importance of large scale integration in each community, and this possibility will be addressed in the following sub-section.

The results (Table 8-5, Figure 8-7) shows a tendency toward higher degrees of verticality in the ceremonial centers. In Period I, the U-shaped ceremonial center of Moro Nuevo 4 have a horizontal tendency, suggesting the centrality of ceremonies in the plazas. While some U-shaped ceremonial centers were built in order to highlight the mounds (Moore 1996c), it is inevitable to think their layouts as horizontal.

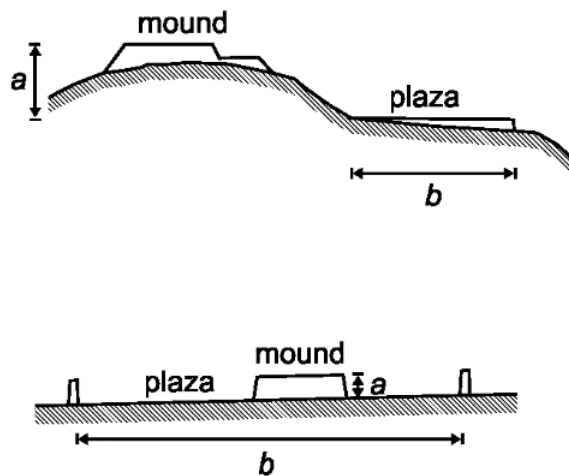


Figure 8-6 Diagram of the vertical (a) and horizontal (b) values used to determine the vertical/horizontal emphasis in ritual architecture.

During Period I/II many of the projected ceremonial centers, despite the abandon of the U layout, continued to emphasize horizontality. The only exception is Quisque, which have a higher vertical difference. This feature would have boosted Quisque visibility from greater distances.

Since Period II, the reduction of plaza size is related to the increase of vertical differences, and, in consequence, ceremonial centers started to emphasize high degrees of verticality. In many cases, this verticality was enhanced by taking advantage of the natural topography (i.e. hills), but also by the construction of high mounds. The range of verticality degrees is high (Figure 8-7) suggesting different topographical conditions or capability of labor mobilization for mound construction, but also a differential interest in plaza performances. Plaza sizes became smaller during this period, indicating more exclusive participation in ritual practices. Two exceptions were Kushipampa and Virahuanca Bajo North, both with large enclosed open spaces, and emphasizing overall a high horizontality, continuing architectural traditions of Period I/II. Whether the degree of horizontality and plaza size respond or not to different strategies of ritual aggregation is analyzed in the following sub-section.

During Period III, the ceremonial center of SLC 302, a probably remodeling and adaptation of an earlier ceremonial center, emphasizes only a moderate verticality. In contrast, the ceremonial center of SLC 305, Chacuas Cucho 1, has higher degrees of verticality. In the first, the ratio is conditioned by the relatively large plaza, while the in the second by the construction of platforms and mounds in the hill. This suggest that plaza performances were relatively more important in the first district, while mound, as visual symbol and ritual space, was relatively more important in the second one.

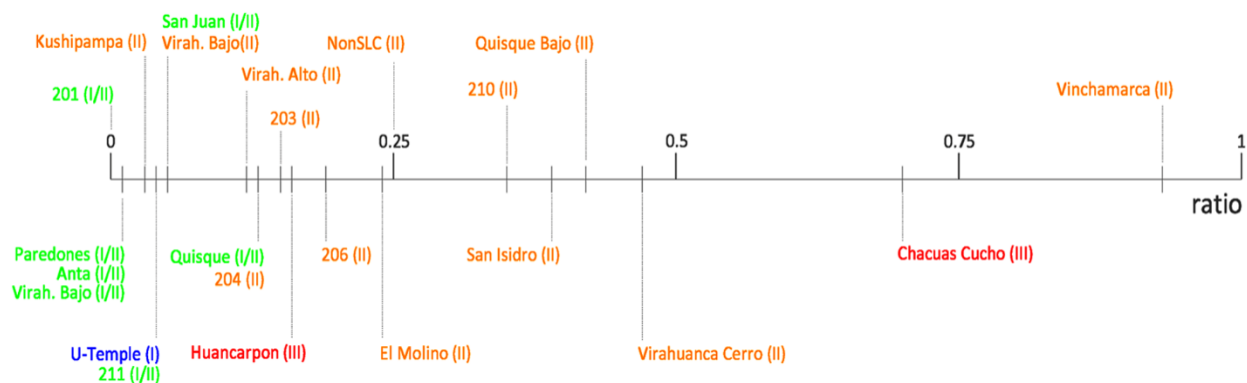


Figure 8-7 Ceremonial centers ranked by the ratio of their maximum vertical difference and the length of their largest plaza.

Table 8-5 Degree of Horizontality/Verticality of Ceremonial Centers.

Period	District	Site Name	Aprox. Max. Mound Height (A)	Aprox. Length of Largest Plaza (B)	Ratio A/B
I	101	Nuevo Moro 4*	7.5	206	0.04
I/II	201	El Algarrobal 4*	0	76	0
I/II	202	San Juan	4.5	100	0.05
I/II	205	Paredones	3.5	277	0.01
I/II	207	Anta	1.7	160	0.01
I/II	211	Quisque Bajo	1.6	41	0.04
I/II	non-SLC	Virahuanca Bajo South	1.5	228	0.01
I/II	non-SLC	Complejo Quisque*	9	69	0.13
II	201	Kushipampa	3.5	125	0.03
II	202	El Molino-Motocachi	11	45	0.24
II	203	Cerro Motocachi 17*	7	48	0.15
II	204	Cerro Chacuas Cucho 5*	6.6	50	0.13
II	205	Cerro San Isidro	17.5	45	0.39
II	206	Cerro Motocachi 8*	5	26	0.19
II	207	Vinchamarca	25	27	0.93
II	208	Virahuanca Cerro	15	32	0.47
II	210	Cerro Pimpon 3*	8	23	0.35
II	211	Quisque Bajo	11	26	0.42
II	212	Virahuanca Bajo North	4	87	0.05
II	non-SLC	Complejo Quisque*	14	57	0.25
II	non-SLC	Virahuanca Alto	11	90	0.12
III	302	Huancarpón	11	70	0.16
III	305	Chacuas Cucho 1*	38	54	0.7

8.3 LABOR POOL AND THE CONSTRUCTION OF THE PUBLIC CENTERS

The construction of public centers require large amount of labor. It has been suggested that the participation in such projects are not necessarily a product of coercion but it could be a mechanism to enhance solidarity and to consolidate groups' identities. In this section I attempt to estimate the amount of labor that would have been required to build the major public centers in each district and compare them with the available population. In this way, I could determine the contribution per capita and if whether some of these projects would have required instead workers from other districts or even other regions.

The approximate labor investment in each public center was calculated estimating how much labor would have required to obtain the rocks and dirt used in walls, platforms and mounds. It was not considered how much labor was used to build the adjacent residential sectors (unless the ceremonial

center is also a residential compound), how much was invested in the construction of defenses (unless the ceremonial center is also a fortress), or how much energy was used to the excavation of moats or the leveling of the terrain. It was not considered neither the amount of energy used for the transportation of the raw material, so it is assumed that most of the raw material was obtained in their surroundings.

The volume of the building was estimated with the dimensions of the buildings from the drafts and plans of the structures, and the estimate of the height of the structures based on photos. The volume estimates (Table 8-6) have to be considered as conservative figures, because without excavations it is difficult to determine the location of the natural terrain. I followed the procedures of Pozorski (1980) who estimates that walls and fills were composed of 50% rock and 50% clay or dirt. The specific gravities of 1.35 gr/cm³ for the clay and 2.73 gr/cm³ (Holmes 1921:24) for the stone (granodiorite) was used to determine the total weight of the raw materials.

Table 8-6 Estimated amount of raw material used in the construction of the major ceremonial centers.

Period	District	Site Name	Constructive Material		
			Aproximate volume (m ³)	Clay/dirt weight (kg)	Stone weight (kg)
I	101	Nuevo Moro 4	129 000	87 075 000	17 608 5000
I/II	201	El Algarrobal 4	50	33 750	68 250
	202	San Juan	7 860	5 305 500	10 728 900
	205	Paredones	11 750	7 931 250	16 038 750
	207	Anta	1 510	1 019 250	2 061 150
	211	Quisque Bajo	1 050	708 750	1 433 250
	non-SLC	Virahuanca Bajo South	1 660	1 120 500	2 265 900
	non-SLC	Complejo Quisque ¹	5 289	3 570 075	7 219 485
II	201	Kushipampa	18 840	12 717 000	25 716 600
	202	El Molino-Motocachi	20 750	14 006 250	28 323 750
	203	Cerro Motocachi 17	350	236 250	477 750
	204	Cerro Chacuas Cucho 5	5 770	3 894 750	7 876 050
	205	Cerro San Isidro	3 660	2 470 500	4 995 900
	206	Cerro Motocachi 8	7 190	4 853 250	9 814 350
	207	Vinchamarca	5 830	3 935 250	7 957 950
	208	Virahuanca Cerro	3 090	2 085 750	4 217 850
	210	Cerro Pimpon 3	2 640	1 782 000	3 603 600
	211	Quisque Bajo	12 650	8 538 750	17 267 250
	212	Virahuanca Bajo North	9 390	6 338 250	12 817 350
	non-SLC	Complejo Quisque	9 530	6 432 750	13 008 450
	non-SLC	Virahuanca Alto	16 600	11 205 000	22 659 000
	302	Huancarpón ²	1 520	1 026 000	2 074 800
III	305	Chacuas Cucho 1 ²	2 810	1 896 750	3 835 650

¹ Only megalithic architecture

² Only period III structures

Table 8-7 Estimated amount of labor investment in each ceremonial center.

Period	District	Site Name	Labor investment (person-days)		
			Clay/dirt excavation	Rock excavation	Total
I	101	Nuevo Moro 4	64 500	352170	416670
I/II	201	El Algarrobal 4	25	137	162
	202	San Juan	3 930	21 458	25 388
	205	Paredones	5 875	32 078	37 953
	207	Anta	755	4 122	4 877
	211	Quisque Bajo	525	2 867	3 392
	non-SLC	Virahuanca Bajo South	830	4 532	5 362
	non-SLC	Complejo Quisque	2 645	14 439	17 083
II	201	Kushipampa	9 420	51 433	60 853
	202	El Molino-Motocachi	10 375	56 648	67 023
	203	Cerro Motocachi 17	175	956	1 131
	204	Cerro Chacuas Cucho 5	2 885	15 752	18 637
	205	Cerro San Isidro	1 830	9 992	11 822
	206	Cerro Motocachi 8	3 595	19 629	23 224
	207	Vinchamarca	2 915	15 916	18 831
	208	Virahuanca Cerro	1 545	8 436	9 981
	210	Cerro Pimpon 3	1 320	7 207	8 527
	211	Quisque Bajo	6 325	34 535	40 860
	212	Virahuanca Bajo North	4 695	25 635	30 330
	non-SLC	Complejo Quisque	4 765	2 6017	30 782
	non-SLC	Virahuanca Alto	8 300	45 318	53 618
III	302	Huancarpón	760	4 150	4 910
	305	Chacuas Cucho 1	1 405	7 671	9 076

Pozorski (1980) considers the one person working during one day could extract either 1350 kg of clay or 500 kg of stone. This ratios were used to determine the total amount of labor as person-days needed in each ceremonial center (Table 8-8). When these numbers are contrasted with the available labor in each district, it results in the estimate of how many days per year would have been required to complete the projects if the same amount of people were used every year to build the structures. This procedure provides an estimate under the assumption that these buildings were built gradually, if the constructions events were more spaced in time (i.e. once every generation) the amount of people or days per year would increase substantially. Consequently, these estimates must be considered as the minimum figures for this activity given these assumptions and with the available data on architecture.

The results (Table 8-8) indicates that some projects such as Nuevo Moro 4 during Period I, and San Juan, Paredones, Complejo Quisque during Period I/II would have required more than three months yearly of labor per capita. This amount of labor seems to be very high, and is very likely that these complexes would have used labor from other districts or even from other regions (such as the lower valley). However, these colossal projects (considering the scale of the population) would disappear

through time. The estimates for the days of labor used in each period decline between Periods I and III (Table 8-9). Many ceremonial centers of Period II could have been built by only the surrounding local population using an average of one month per year. Some others, such as El Molino-Motocachi (SLC 202), Quisque Bajo (211), Virahuanca Bajo North (212), Complejo Quisque (non-SLC) and Virahuanca Alto (non-SLC), would have required up to two months per year in average. Finally, during Period III, most of the structures that could have been built during this time would have required just few days per year in average per person.

Table 8-8 Estimated days of labor per year required for each ceremonial center.

Period	District	Site Name	Construction time (centuries)	Labor investment (person-days)		Available Labor (persons) ¹	Days of Labor per year
				Total	Total per century		
I	101	Nuevo Moro 4	6.5 +	416670	64103	679	94
	201	El Algarrobal 4	~ 0.5 ²	161.5	323	1525	< 1
I/II	202	San Juan	~ 0.5	25387.8	50776	286.5	177
	205	Paredones	~ 0.5	37952.5	75905	607	125
	207	Anta	~ 0.5	4877.3	9755	556	18
	211	Quisque Bajo	~ 0.5	3391.5	6783	259.5	26
	non-SLC	Virahuanca Bajo-S	~ 0.5	5361.8	10724	251	43
	non-SLC	Complejo Quisque	~ 0.5	17083.47	34167	251	136
	201	Kushipampa	3.5	60853.2	17387	1525	11
II	202	El Molino-Motocachi	3.5	67022.5	19149	286.5	67
	203	Cerro Motocachi 17	3	1130.5	377	170	2
	204	Chacuas Cucho 5	3	18637.1	6212	655.5	9
	205	Cerro San Isidro	3.5	11821.8	3378	607	6
	206	Cerro Motocachi 8	3	23223.7	7741	238	33
	207	Vinchamarca	3	18830.9	6277	556	11
	208	Virahuanca Cerro	3	9980.7	3327	182	18
	210	Cerro Pimpon 3	3	8527.2	2842	332	9
	211	Quisque Bajo	3	40859.5	13620	259.5	52
	212	Virahuanca Bajo North	3	30329.7	10110	169.5	60
	non-SLC	Complejo Quisque	3	30781.9	10261	251	41
	non-SLC	Virahuanca Alto	3	53618	17873	251	71
III	302	Huancarpón	6.5	4909.6	755	197	4
	305	Chacuas Cucho 1	6.5	9076.3	1396	291.5	5

¹ The available labor pool was calculated as half of the total available population for the district

² I tentatively use a 50 years construction window. Considering the condition of most of the buildings, it is possible that the lapse is shorter, augmenting the average labor per capita by century, and consequently not changing the interpretations given for this phase.

These results show that many of the first projects designed after the abandonment of Nuevo Moro 4, the U-temple of Period I, were very likely using labor pools larger than the population living in the surrounding areas inside the district or imposing very high labor taxes to their own population. These strategies were not sustainable in the long term, and they were abandoned in favor to projects that could be accomplished mainly with the populations inside the district and/or with lower labor taxes. The two districts (SLC 201 and 204) that later become the major political units during the Period III, were already imposing very low labor tax to their population. In fact this tendency consolidated in Period III, where the few structures that could have been built in this epoch in Huancarpón and Chacuas Cucho 1 would have required very low labor requirements.

Table 8-9 Estimated days of labor per period.

Period	Total labor investment (person-days)	Total Available Labor	Days of Labor per year
I	64103	622	103
I/II	188432	4238	45
II	118553	4238	28
III	2152	611	4

8.4 USERS AND AUDIENCES OF THE CEREMONIAL CENTERS

Who were the potential users of ceremonial spaces is probably one of the most important questions in the study of public architecture, and nevertheless it has been avoided or just speculated. Sometimes the main limitation is the lack of settlement studies that include the location of people. For instance, current (or attempts of) reconstructions of Middle and Late Formative settlement systems are based mainly in the location of public centers (Billman 1996; Wilson 1995). In other cases, the provenience of the audience is assumed by analogies with ethnohistorical accounts (Burger 1992; Lumbreras 1993) or simply it is not specify.

This sub-section is an attempt to study who were the users of the ceremonial centers based in settlement data. One basic assumption is that audiences are primarily local, and then from neighboring communities (compare with Lumbreras 1993). Foreigners cannot be discarded, in fact it is very likely they were present, but doubtfully they may have corresponded to a large portion of the audience. Then I analyze if leaders and their families may have enjoyed or not preferences in access to these public spaces.

8.4.1 Plaza Audience: Where did the public come from?

Different ways to estimate the audience of plaza have been attempted in the Central Andes using ethnographic data, usually resulting in poor results (Moore 1996c). Instead, I decided to use an alternative approach in which the relationship between the size of a ritual space and its users, the members of the local group, was obtained. This relationship, expressed as a ratio, was used to estimate the audiences of the other ritual spaces in the region.

Ritual practices are carry out at multiple scales, because they can be used as integrative mechanism of different scale organizational modes (Gearing 1958). Considering this, some ritual practices may have involved the participation of the people from the whole region and/or people from distant regions (Lumbreras 1993), but others must have been carry out only by and for the local group. In consequence, it is expected for this small ceremonial spaces a direct relationship between plaza sizes and the local households group.

One example of this association was identified in the survey zone. A land cut by two dry ravines or *quebradas*, contains dwellings and a small enclosure. This is part of the PV31-351 (Virahuanca Bajo) settlement, and immediately outside of the boundaries of SLC 212. The occupation is mostly Period II and it is very likely that the enclosure is also a prehispanic construction because: a) there are other enclosures of similar size that are definitively prehispanic in the survey zone, b) modern people usually remove the soil in the surroundings to build small reservoirs but in this case no soil disturbance is visible close to the area, c) a small modern reservoir have been built partially over it.

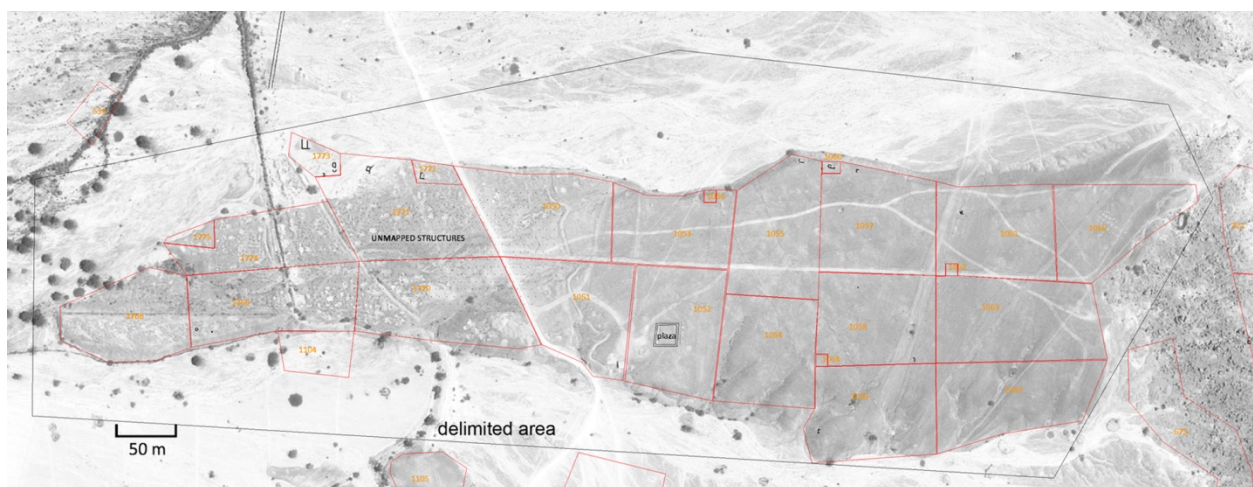


Figure 8-8 Delimited area used to estimate the audience for local scale ritual space (plaza). Structures (black), survey units (red) and their label (orange) are indicated in the image.

The area of the enclosure is 268 m², or approximately 16.4 meters by side, and it is hard to imagine this space filled by dozens or hundreds of people, so definitively it is not a household (five persons) scale space, but it is neither a supra-local community scale public space. It must have been used for ceremonial purposes by the local groups. If the estimated population of the delimited local group (Figure 8-8) is 16 people in average every century, then the ratio is 16.75 m² of plaza per person. It is possible that the other plazas may involve different ratios because ritual practices may differ, but this assumption and educated guess is less problematic than the attempt to use ethnographic ratios of dubious utility considering the unreal results (Moore 1996c:146-153).

Two estimates for plaza audience were obtained. The minimum estimate involve the use of only the largest plaza, while the maximum involve the sum of the audience of all the plazas in each ceremonial center. The minimum estimate considers that the largest plaza were designed to host the total audience, and the smaller ones were used by a fraction of this largest audience pool while ritual activities develop. The maximum estimate considers that multiple plazas were the public spaces of different groups of the community, and consequently, the total audience in the center is the combined estimate of all plazas. We cannot determine without doubt if ritual was performed simultaneously or sequentially, or if spaces were designed by one group or multiple, but at least, this logic permits to have an educated guess for the estimate of audiences to carry out the comparison of the ceremonial centers. When a ceremonial center have only one plaza, minimum and maximum have the same value.

Once the minimum and maximum estimates were obtained (Table 8-10), it was compared with the available population (the average population estimate with the assumption of 75% of occupancy). In order, to determine the minimum and maximum catchment zones, concentric rings from each major ceremonial center were created. Unlike my use of the rings to determine demographic centralization, in this analysis each ring was determined by a specific number of walking minutes from the ceremonial center.

First, raster of distances from the ceremonial center were created in ArcMAP 10.1, using Waldo Tobler's hiking function. The results show the number of minutes that cost to go from one specific point of the survey zone to the ceremonial center under analysis. Then each raster were reclassified every two minutes of value and then converted to polygons.

The population estimates for each ring polygon was extracted and compared with the lower and higher audience estimates for the major ceremonial center of each district by period. Then it was identified the rings which cumulative population estimate -from the innermost ring to it-, contained the minimum and maximum audience estimates. Finally the catchment areas were compared with the district

boundaries to determine if these centers would have primarily attract only people from inside the district, or if it would have involved large scale supra-district aggregations.

Table 8-10 Comparative chart for estimated audience of largest plaza in each district by period.

Period	District	Site Name	Area Largest Plaza (Sq. m.)	Total Area Plazas (Sq. m.)	Audience of Largest Plaza (people)	Audience of All Plazas (people)	Ratio Audience-All Plazas / District Population
I	101	Nuevo Moro 4*	27115	27115	1619	1619	1.19
I/II	201	El Algarrobal 4*	4845	4845	289	289	0.09
I/II	202	San Juan	4901	6070	293	362	0.63
I/II	205	Paredones	46470	69575	2774	4154	3.42
I/II	207	Anta	17418	32116	1040	1917	1.72
I/II	211	Quisque Bajo	1510	2866	90	171	0.33
I/II	non-SLC	Virahuanca Bajo South	27567	27567	1646	1646	3.28
I/II	non-SLC	Complejo Quisque*	1966	1966	117	117	0.23
II	201	Kushipampa	7985	29492	477	1761	0.58
II	202	El Molino-Motocachi	1798	2987	107	178	0.31
II	203	Cerro Motocachi 17*	952	1472	57	88	0.26
II	204	Chacuas Cucho 5*	1471	4250	88	254	0.19
II	205	Cerro San Isidro	1631	1794	97	107	0.09
II	206	Cerro Motocachi 8*	1853	3799	111	227	0.48
II	207	Vinchamarca	268	421	16	25	0.02
II	208	Virahuanca Cerro	520	1306	31	78	0.21
II	210	Cerro Pimpon 3*	363	724	22	43	0.06
II	211	Quisque Bajo	1424	2208	85	132	0.25
II	212	Virahuanca Bajo North	7390	31799	441	1898	5.6
II	non-SLC	Complejo Quisque*	2291	4507	137	269	0.54
II	non-SLC	Virahuanca Alto	2952	2952	176	176	0.35
III	302	Huancarpón	3118	17163	186	1025	2.6
III	305	Chacuas Cucho 1*	1259	2243	75	134	0.23

The plaza of the ceremonial center in Period I was designed to gather more people than it is estimated for the district SLC 101. In fact, with these estimates the rituals practiced in this ceremonial center could have gathered the whole survey zone population (Figure 8-9). This suggest that these ceremonies could have been a powerful mechanism of social integration at regional level during this period as it has been proposed for other similar ceremonial centers (Dillehay 2004; Ikehara and Shibata 2008).

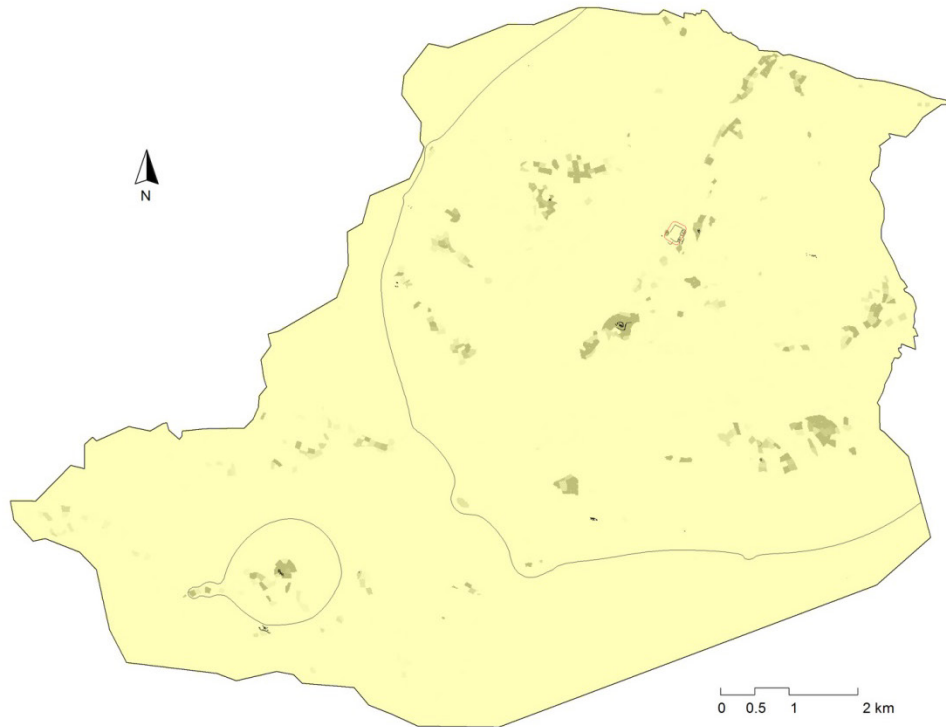


Figure 8-9 Catchment zone (yellow) for the estimated audience of the Period I U-shaped ceremonial center.

The catchment for the unfinished projects of Period I/II were analyzed with the population estimates of Period II. The results show that at least three of them (Paredones, Anta and Virahuanca Bajo South) were designed to gather people from several districts (Figure 8-10). Moreover, one of them, Paredones, was capable to host audiences more than two times the survey zone population during Period I. In contrast, the others were designed to host ceremonies for only the population in their surroundings.

During Period II, most of the ceremonial centers were designed to host mainly audiences coming from inside the district (Figure 8-11) suggesting that integrative role of ritual practices diminished or was focused in the definition of social boundaries between districts. Moreover, the fact that many of these ceremonies were using spaces that can host only a very small fraction of the district population could be interpreted as a marker of social inequalities during rituals. The only exception is the ceremonial center of district SLC 212, Virahuanca Bajo North, which could have gathered audiences not only from its own district but also a substantial proportions of other districts' population. Consequently, in a new political landscape in which leaders were carrying out rituals to integrate local population and highlighted social differences, the leaders of SLC 212 were trying to follow the old-style political strategy of widening of social network by massive ritual aggregations of people from several districts

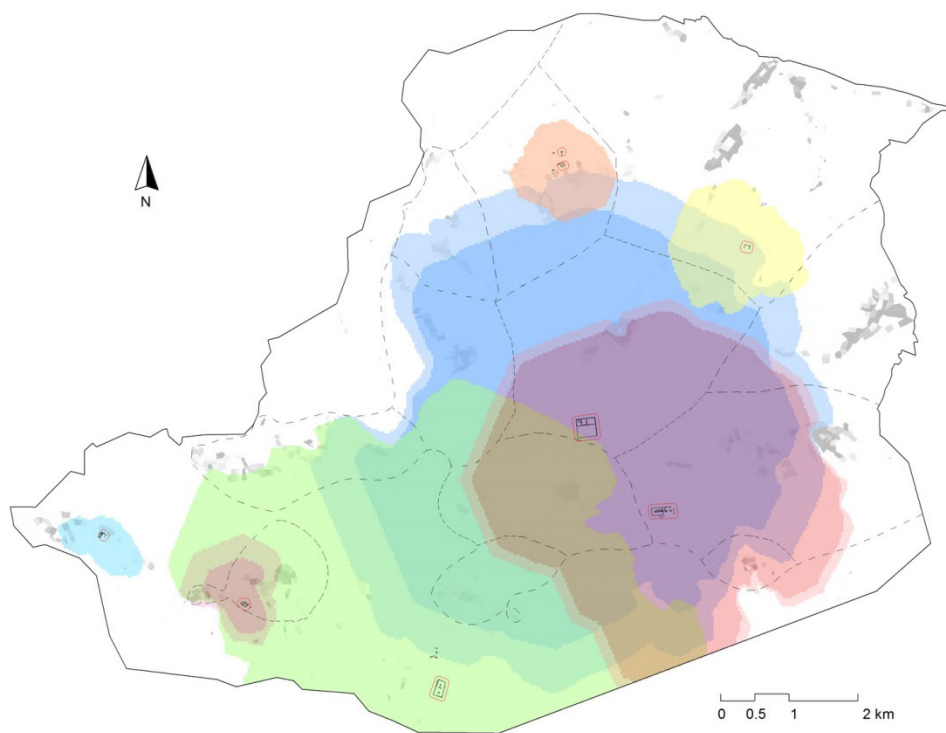


Figure 8-10 Catchments for minimum (dark tones) and maximum (light tones) estimated audiences of each unfinished ceremonial center of Period I/II (using population estimates for Period II).

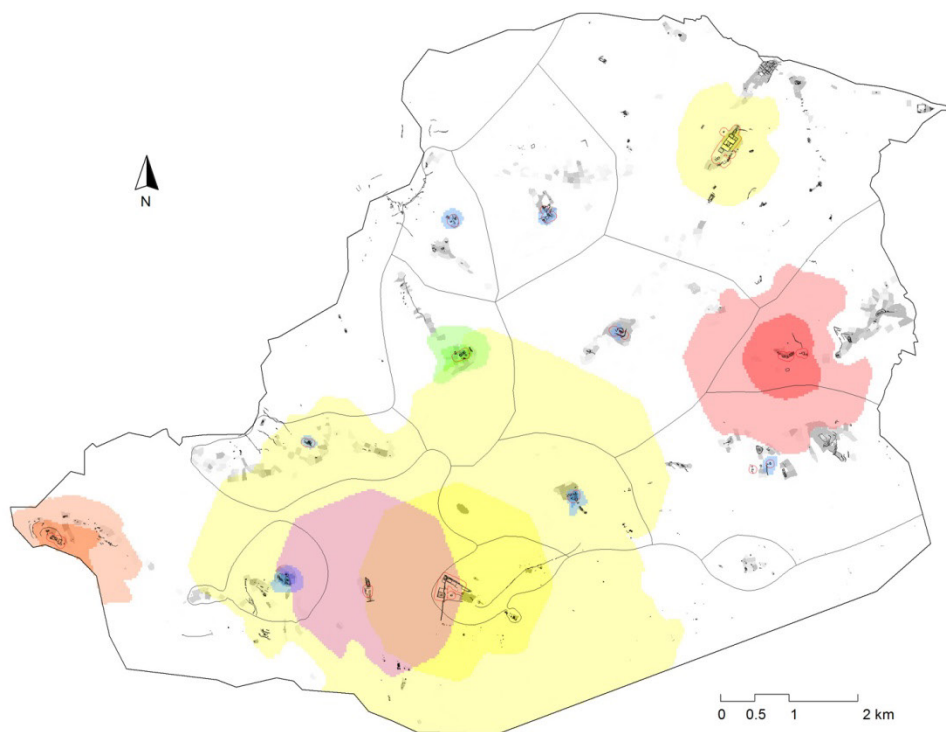


Figure 8-11 Catchments of minimum (dark tones) and maximum (light tones) estimated audience for each ceremonial center of Period II.

Finally, during Period III (Figure 8-12), the only two ceremonial centers show distinct characteristics. While the public spaces of Chacuas Cucho 1, in SLC 305, was used for ceremonies where a small fraction of the district population could assist, the public spaces of Huancarpón, in SLC 302, could have been used to carry out relatively large scale ceremonies, and it could have potentially hosted up to 70% of the survey zone population. This suggest that leaders of SLC 302 were returning to old political strategies of integrating the community by massive ritual aggregations.

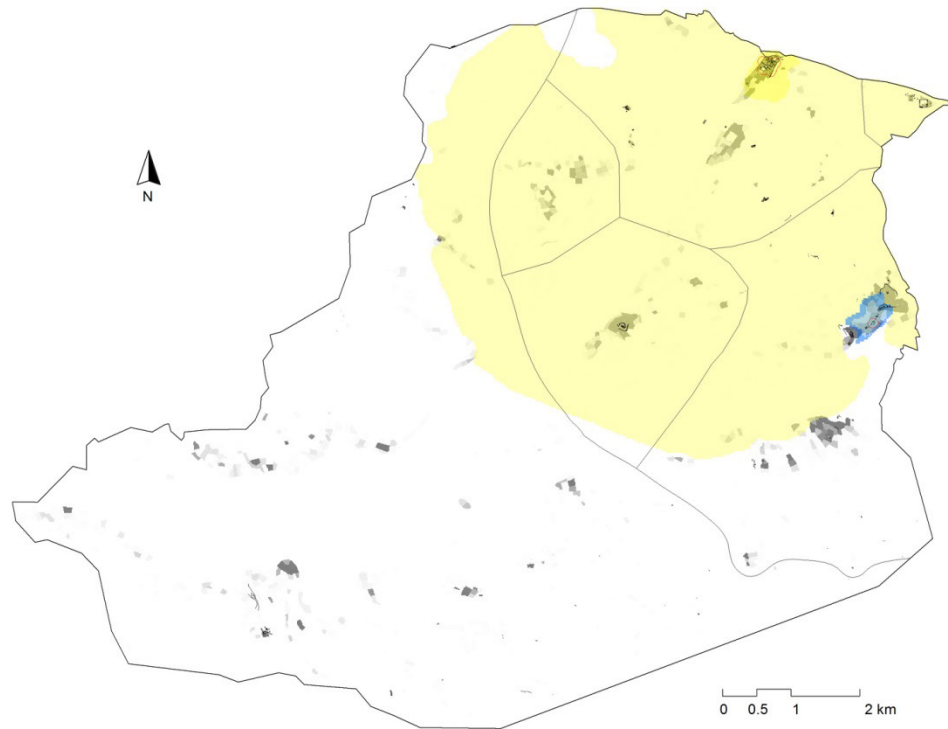


Figure 8-12 Catchments of minimum (darker color) and maximum (lighter color) estimated audience for each ceremonial center of Period III.

8.4.2 Leaders and Ceremonial Centers

The previous analysis has shown that exclusionary rituals practices gained favor through time. In contrast with Period I ceremonies, the ceremonial spaces of Period II could hold only a portion of the district population. The analyses of this subsection evaluate if affluent households had a preferential access to these spaces. If so, they must have been the main participants of these rituals and ceremonies. In addition, ritual spaces may be important because they were symbols of power of the communities and

their leaders. Having their houses close to these buildings would permit leaders to capitalize its meaning, accentuating their social position by where they lived.

If leaders have had such preference I expect to find a difference of distance between higher ranked households and lower ranked households, being the values smaller for the first ones. In this analysis, all the ceremonial centers (not only the major ones) were used. Raster database by period were created by determining the time (in minutes) that takes to go from every location to the ceremonial centers. I used the path-distance tool in ArcGIS 10.1, with the ASTER DEM as the cost surface raster, and Waldo Tobler (1993) hiker function.

The average time of higher status households and lower ranked households are compared by displaying the error ranges for the 80, 95 and 99% confidence level in the form of bullet graphs. Finally, the difference (in minutes) between higher and lower ranked households are presented as the equivalent number of meters a person walk normally in flat surface during such time (5 km/h following Tobler 1993).

The results for Period I (Figure 8-13, Table 8-11) indicate that in SLC 101, higher ranked households were closer in average to the ceremonial centers than lower ranked households, however this difference is only moderate. The results for the households in SLC 102 and outside the districts are relatively meaningless because no ceremonial centers were found in them, and this results may been heavily affected by topography.

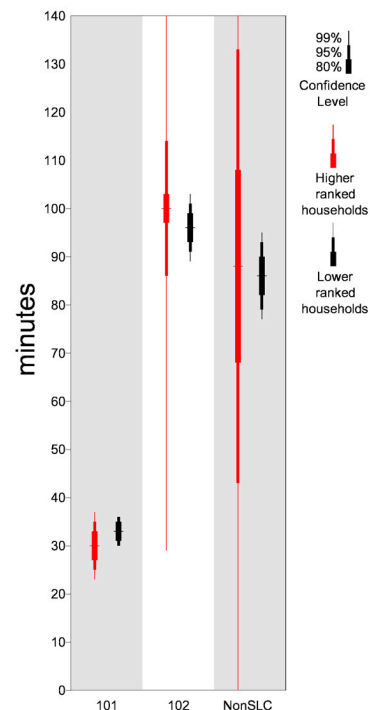


Figure 8-13 Comparison with bullet graphs of the average time that takes to go to the closest ceremonial center from higher and lower ranked households during Period I.

Table 8-11 Difference in average distance between higher and lower ranked households by district during Period I.

District / Supra-local community	Average distance of households to the ceremonial centers		Difference between higher ranked household and lower ranked households	
	In minutes	Equivalent distance in flat terrain (meters)	In minutes	Equivalent distance in flat terrain (meters)
101	32.3	2695	-2.9	-244
102	96.3	8022	+4.1	340
Non-SLC	86	7170	+2.5	211

During Period II, with the exception of SLC 201 and outside the districts, there is no real differences in proximity to the ceremonial centers among the population (Figure 8-14,

Table 8-12). The higher ranked households inside SLC 201 and those outside districts were in average moderately closer to the ceremonial center in comparison to the lower ranked households. Similar tendency, but involving smaller differences, was found in the districts SLC 202, 204, 206 and 212. In the other districts, differences are minimal, or lower ranked households are closer in average than higher ranked ones. In the case of SLC 209, no plaza was identify, and consequently the analysis is meaningless for this district.

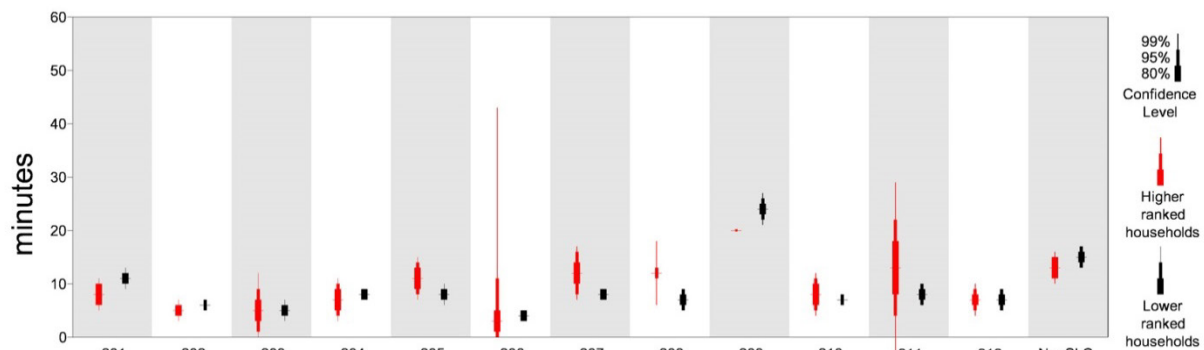


Figure 8-14 Comparison with bullet graphs of the average time that takes to go to the closest ceremonial center from higher and lower ranked households during Period II.

Table 8-12 Difference in average distance between higher and lower ranked households by district during Period II.

District / Supra-local community	Average distance of households to the ceremonial centers		Difference between higher ranked household and lower ranked households	
	In minutes	Equivalent distance in flat terrain (meters)	In minutes	Equivalent distance in flat terrain (meters)
201	10.5	908	-2.9	-239
202	5.5	466	-0.4	-35
203	5.1	423	0.2	15
204	7.9	672	-1.1	-89
205	8.3	649	3.3	274
206	4	337	-0.9	-78
207	9	701	3.7	308
208	7.4	595	4.6	381
209	24	2010	-4.6	-385
210	7.1	571	2.4	197
211	8.5	679	2.4	200
212	7.2	618	-0.5	-39
NonSLC	13.8	1179	-2.5	-205

This suggest that in most of the districts, living closer to the ceremonial centers was not a priority for leaders. The high fragmentation observed during this period made districts' territories small, and consequently the majority of households were indeed relatively close to one of the ceremonial centers in the region. It would have been very hard to get any advantage of this situation unless leaders were exclusively living next to the ceremonial centers, which it is not the case. The few observed exceptions, SLC 201 and outside the districts, are located in large territories where distance difference could be really meaningful.

During Period III, there was only two ceremonial centers, in SLC 302 and 305. In the first, the affluent households were living significantly closer to the ceremonial center than lower ranked households. In contrast, in SLC 305 there is almost no difference between them. No other major ceremonial center has been found in the region during this period, and consequently, the analysis is not that helpful for the households outside these two districts. For instance, the difference observed for SLC 303 and 304, reflect the existence of certain number of low ranked households living at in the west half of the district, and some affluent households living near the boundaries with SLC 304, respectively.

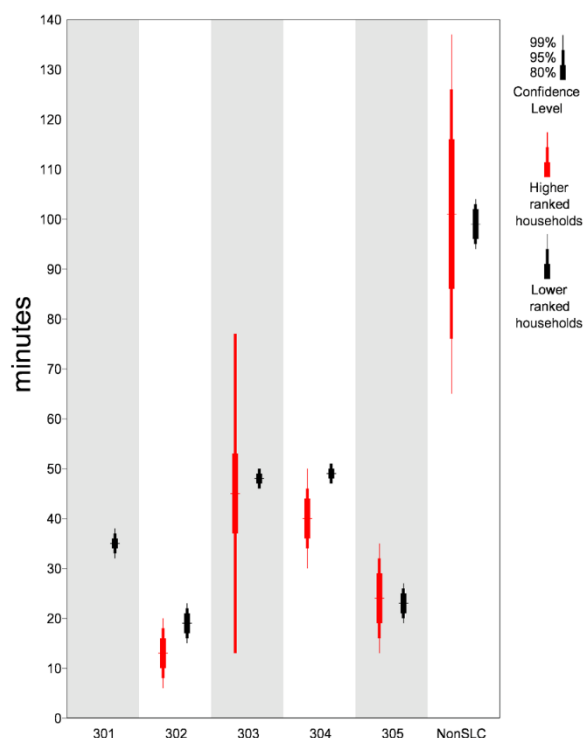


Figure 8-15 Comparison with bullet graphs of the average time that takes to higher and lower ranked households to go to the closest ceremonial center during Period III.

Table 8-13 Difference in average distance between higher and lower ranked households by district during Period III.

District / Supra-local community	Average distance of households to the ceremonial centers		Difference between higher ranked household and lower ranked households	
	In minutes	Equivalent distance in flat terrain (meters)	In minutes	Equivalent distance in flat terrain (meters)
301	34.5	2877	-	-
302	17.6	1549	-5.4	-449
303	47.8	4005	-3.4	-284
304	47.5	4057	-8.7	-721
305	23.3	1943	0.3	23
NonSLC	99.1	8248	2.2	183

8.5 OTHER ACTIVITIES: LARGE SCALE STORAGE

Goods can be stored in several ways. Short term storage can be carried out by drying and hanging items in the ceilings, in large ceramic vessels, etc. However, the storage of large quantities of goods for a long time requires the construction of specialized structures in order to isolate the goods from potential natural threats, and control the access to them (i.e. Morris 1981). Consequently, storage structures can be identified by several features such as very small size, or the lack of doorways, by standardized forms and sizes, by agglutination, by remains of the stored goods, or the presence of materials that improved the conditions of preservation (sand, pottery, etc.).

It was not possible to clearly identify structures on the surface of Nuevo Moro 4, the ceremonial center of Period I. One obstacle is that many later constructions covered much of the surface of the mounds. Excavations would be needed to provide more details on the architecture of the center.

Period II centers have much better surface visibility because they are located in hills tops and slopes without much intensive later occupation. Structures that we might identify as storage units can be found at Kushipampa (SLC 201), Cerro Motocachi 8 (SLC 206), Cerro Pimpon 3 (SLC 210), and Virahuanca Bajo North (SLC 212). Sometimes, as at Kushipampa and Virahuanca Bajo North, these are rows of square rooms. At the other sites, they are square rooms located between patios and corridors (Figure 8-16). Previously, during the transitional Period I/II, some of the ceremonial centers, such as Anta, utilized similar rows of squared rooms in the surroundings. In addition, the remains of oversized vessels can be observed in the eastern plaza in the monumental core of Kushipampa (Figure 8-17). These vessels could

have served for storage of water or grains, but also as containers for drinks to be served in ceremonies carried out in the adjacent plaza.

For Period III, I found underground storage spaces in the dwellings of Chacuas Cucho 1, but no clear evidence for storage structures associated with the ceremonial centers. In Huancarpón, there are rows of walls with perpendicular subdivisions, but I cannot determine whether they were just construction features of the mounds, or rooms for store goods that were later filled with cobbles to raise the platform.

Overall, for the three periods, I could not measure with certainty the storage functions represented in of the ceremonial centers, because much architecture was ambiguous in terms of function, and because of differential preservation of the centers.

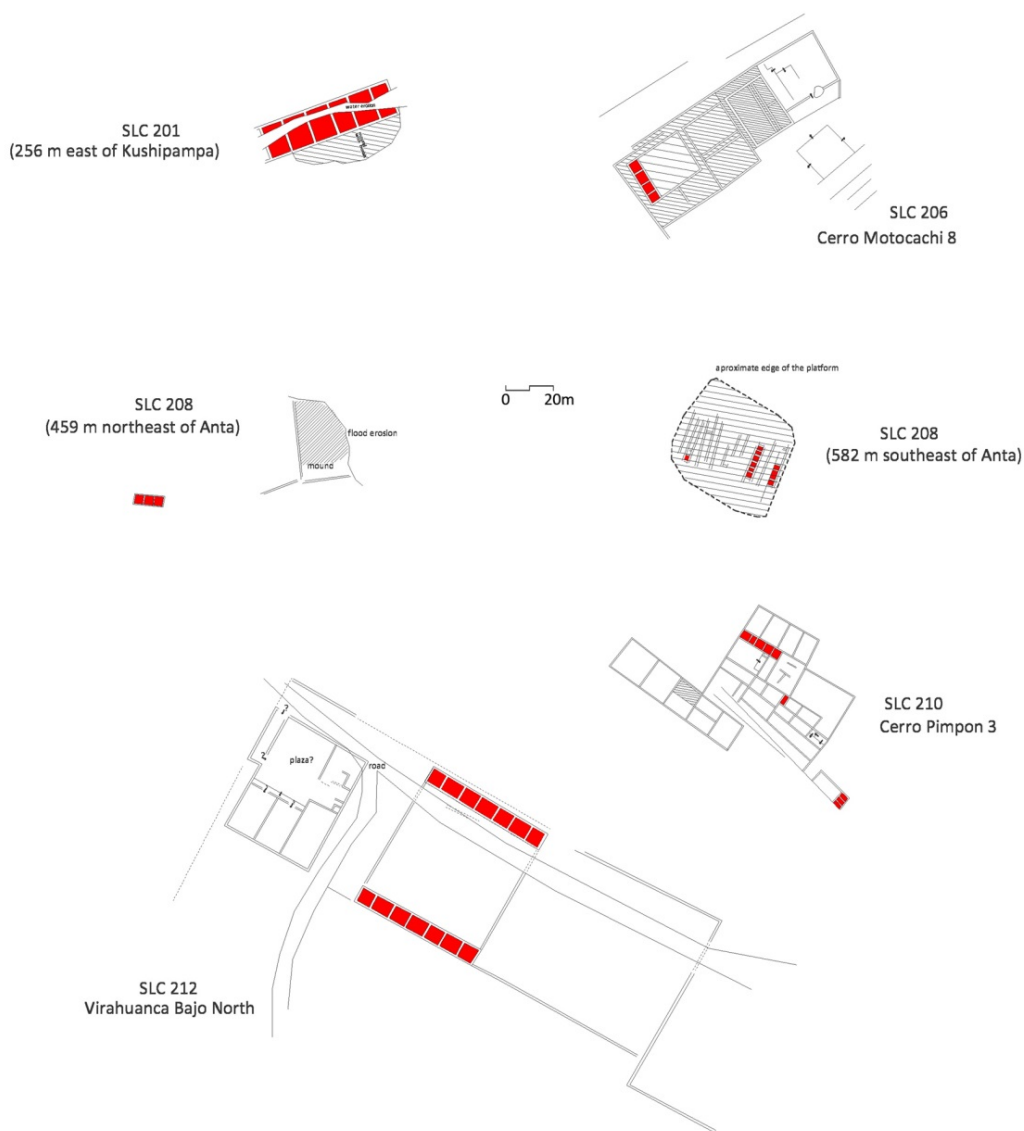


Figure 8-16 Possible storage structures (in red) in or near the ceremonial centers.



Figure 8-17 Oversized vessels from Kushipampa

8.6 THE SETTLEMENT CONTEXT AND STYLISTIC VARIABILITY OF CEREMONIAL CENTERS

Many of the characteristics of the public spaces previously discussed such as their topographical location, the existence of associated residential areas, their vertical/horizontal emphasis, the size of ceremonial spaces, and their architectural depth, are those characteristics in which the ceremonial centers varied from one another. One way to compare the centers is in terms of the settlement context. A second way is comparing the architectural styles. However, because the identification of styles is highly subjective, I will focus only on describing and analyzing the centers in terms of the previously identified Megalithic architectural tradition (Daggett 1983).

8.6.1 Settlement Context of Ritual Spaces

Study of the context of public ritual spaces, or plazas, in their settlements follows from two approaches. The first approach is to consider the type of terrain where settlement and ritual spaces were built. For instance, the valley floor offers relatively easy access to the ritual space for any household living nearby. Pampas (dry alluvial fans) offer easy access too, but these are usually located at the edges or margins of the cultivable area. Hill slopes and hilltops offer relatively more difficult access and space for building is limited, but elevated locations offer improved defensive conditions. The second approach considers the built environment in which plazas are embedded. This approach involves a consideration of the functional

characteristics of the surrounding buildings. The physical setting can range from enclosures without associated residential areas, to plazas built surrounded by dense residential areas, such as in the hilltop complexes or fortified villages (Table 8-14, [Error! Reference source not found.](#)).

Table 8-14 Classes of settlement context for ceremonial spaces.

Settlement Context Type	Description
U-temple	Inside and as part of a U shaped ceremonial center.
Enclosure	Open space surrounded by perimeter walls, no identifiable internal subdivisions, and usually isolated or separated from other constructions.
Mound-enclosure complex	Orthogonal layout with enclosure built adjacent to mounds (Kushipampa Tradition). If finished, surrounded by residential areas.
Enclosed mound complex	Large enclosures that surround wide open spaces and centrally located low mounds.
Fortress	Open spaces built inside fortresses. Residences may be found outside the fortress.
Hilltop complex	Plazas, generally over one or several platforms, as part of a monumental core inside hilltop village with organic layout. In contrast to the Mound-enclosure type, lacks orthogonal layout. Lacks perimeter walls.
Palace/Elite complex	Plaza as part of higher status residential complex. Orthogonal layout, but smaller rooms and patios.
Fortified village	Plazas detached from monumental cores and embedded inside hilltop villages with organic layout and surrounded by several perimeter defensive walls.

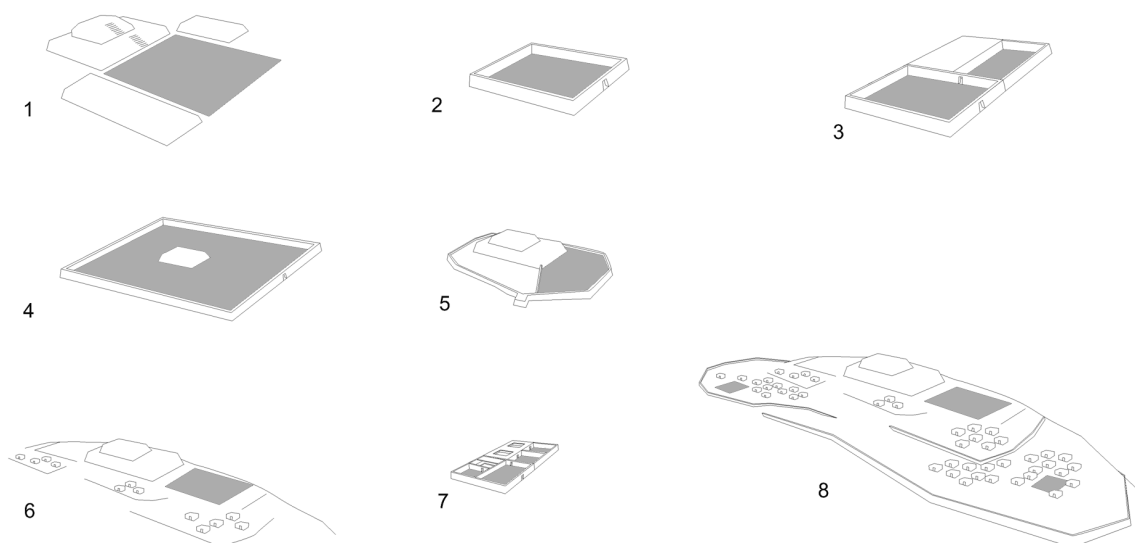


Figure 8-18 Graphical representation of settlement context of plazas: U-temple (1), enclosure (2), mound-enclosure complex (3), enclosed mound complex (4), fortress (5), hilltop complex (6), elite compound or palace (7), and fortified village (8). Plazas are indicated as gray shaded areas. These models do not represent real settlements.

Table 8-15 Classification of ceremonial centers according to their settlement context.

Period	District	Site Name	Plaza Context
I	101	Nuevo Moro 4*	U-temple
I/II	201	El Algarrobal 4*	Enclosure
I/II	202	San Juan	Mound-Enclosure Complex
I/II	205	Paredones	Mound-Enclosure Complex
I/II	207	Anta	Enclosed Mound
I/II	211	Quisque Bajo	Enclosure
I/II	non-SLC	Virahuanca Bajo South	Enclosed Mound
I/II	non-SLC	Complejo Quisque*	Fortress
II	201	Kushipampa	Mound-Enclosure Complex
II	202	El Molino-Motocachi	Mound-Enclosure Complex
II	203	Cerro Motocachi 17*	Hilltop Complex
II	204	Cerro Chacuas Cucho 5*	Hilltop Complex
II	205	Cerro San Isidro	Hilltop Complex
II	206	Cerro Motocachi 8*	Hilltop Complex
II	207	Vinchamarca	Hilltop Complex
II	208	Virahuanca Cerro	Hilltop Complex
II	210	Cerro Pimpon 3*	Palace/Elite Compound
II	211	Quisque Bajo	Fortress
II	212	Virahuanca Bajo North	Enclosed Mound
II	non-SLC	Complejo Quisque*	Fortress
II	non-SLC	Virahuanca Alto	Fortress
III	302	Huancarpón	Hilltop Complex/Fortified Village
III	305	Chacuas Cucho 1*	Fortified Village

Table 8-15 and the map in Figure 8-19 summarize the classification of the settlement contexts of the public spaces. The U-shaped ceremonial complex type was only represented at the Period I center of Moro Nuevo 4. During the transitional Period I/II, new traditions emerged in the area. The first of these, the Enclosure type, was mainly found in the periphery of SLC 201 and 211. The second, the Enclosed Mound type, developed mainly in the southern margin of El Loco River, in Virahuanca Bajo South and Anta. The ceremonial center of SLC 212, Virahuanca Bajo North, also situated in this margin, was probably founded during this period but, in contrast with the others, it was completed and used during the Period II. The third new component was the Mound-Enclosure Complex, or the Kushipampa Tradition, represented in unfinished buildings at San Juan and Paredones. Finally, the fourth tradition is represented by Quisque, a monumental fortress built on the slope of the hill. This ceremonial center may have been the first built in a highly defensive terrain. With the exception of the Quisque fortress, the unfinished complexes of the Period I/II lack of significant residential areas.

During the Period II, some ceremonial centers were built following the appearance of the transitional Period I/II architectural traditions. The ceremonial centers of SLC 201 and 202 followed the

Mound-Enclosure Complex pattern. The SLC 212 ceremonial center was built in the Enclosed Mound tradition. The centers of SLC 211 and outside the districts were fortresses, but without the megalithic masonry of Quisque. The preference for living in defensive locations was critical in the emergence of the Hilltop Complexes. These were settlements where the residential area were organically growing around highly defended public spaces. Finally, a higher status complex, very different from the rest of ceremonial centers, was identified in SLC 210. In this settlement, higher status quarters (according to the quality of the construction) were associated with public spaces, suggesting a “privatization” of the public spaces, much like what was happening in the Lower Valley at settlements such as Caylán (Chicoine and Ikehara 2014).

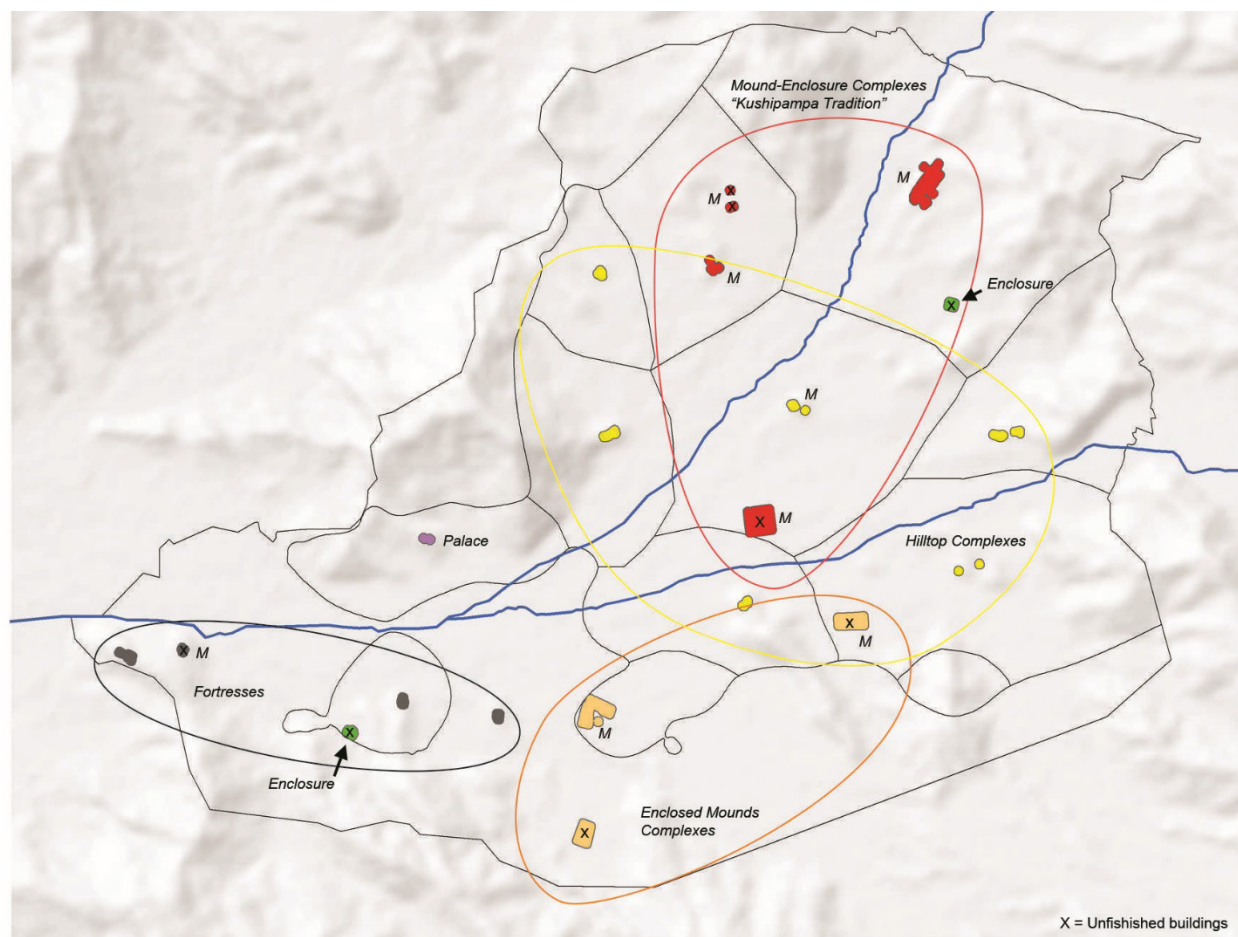


Figure 8-19 Distribution of types of settlement contexts of ceremonial spaces for Period I/II and Period II.

The distribution of the settlement context types (Figure 8-19) suggests the existence of multiple levels of interaction. On the one hand, the distribution of the Kushipampa Tradition, north of the Loco River, suggests interaction and sharing of ideas relating to leadership, authority, and public ceremony.

After all, these communities and their leaders decided to build their ceremonial centers with shared architectural canons and spatial layouts, suggesting they were carrying out similar rituals. The centers “functioned,” and were experienced, in the same way in each of these districts.

The distribution of the Enclosed Mound Complexes Tradition cannot be compared to the Kushipampa case above, because only one center was Enclosed Mound Complex was finished. Its builders, the SLC 212 community, may have been investing in this kind of architecture as part of the strategy to form an alliance south of the Loco River, as is also suggested by some of the analysis described previously.

In contrast, the extensive distribution of the other types of contexts for ceremonial space does not suggest the formation of sub-regional alliances or shared ceremonial practices among districts. These types were not formal traditions, but were instead individualistic. These centers represent practical decisions of how to integrate ritual in the fabric of their settlements. Some of these communities decided to insert plazas in the middle of the towns (Hilltop Complexes type), others decided to incorporate them in the layout of their fortresses (Fortresses type), or in the leaders’ residences (Palace type), while others decided to build enclosures to avoid disrupting domestic space (Enclosures type). At the end, what the distribution of these centers and their context indicates is the location of communities that were autonomous in ceremonial center usage, that tried to create their own particular ritual spaces, and that used individualized centers to ritually consolidate their own local identity.

Finally, during Period III, all the previous settlement types were abandoned in favor of Fortified Villages, a more complex form of Hilltop Complex, that centralized the functions performed by all the previous ceremonial centers and economic processes of the survey zone. Public areas were integrated into the heart of the residential areas and defensive structures.

8.6.2 The Tradition of Megalithic Architecture

A distinctive set of construction techniques known as megalithic architectural style has been previously identified in the survey zone (Daggett 1983, 1984). Recent work has dated this tradition into the Final Formative Period (Ikehara 2010a), but possible earlier versions or antecedents have been identified at Cerro Blanco de Nepeña during the Nepeña Phase (Late Formative Period) of the Lower Valley (Shibata 2014).

This particular architectural style, best represented in Kushipampa (PV31-56) and Paredones (PV31-64) is characterized by the use of large cut-stones, some of which can weigh several hundreds of

kilograms (Figure 8-20). Some of the most elaborate buildings have impressive doorways with stone lintels of 2-3 meters width, and corner stones with smooth finishing (Ikehara 2010a).



Figure 8-20 Megalithic style in El Molino-Motocachi (a), Paredones (b), Vinchamarca (c), and Quisque (d).

Megalithic Architecture distinguishes a local style of the Middle Nepeña Valley, from other traditions in the Lower Valley during the Final Formative (Ikehara and Chicoine 2011). But not all the monuments were built with this style. In this section, I identify which ceremonial centers were built in this Megalithic Architecture tradition and examine its spatial distribution relative to the supra-local communities in the Valley.

At the Lower Valley's Cerro Blanco de Nepeña, the megalithic style was used for the Nepeña Phase mound during the Late Formative (Shibata 2014). However, in the survey zone, the current available information does not indicate the use of this style in Nuevo Moro 4 during Period I. It will require excavations in this site to confirm whether this community adopted this style during this period.

As can be seen (Table 8-16) this tradition does appear at some of the unfinished projects of the Period I/II, and at many of ceremonial centers in Period II. The ceremonial centers of the Mound-

Enclosure Complex or Kushipampa Tradition, all located north of the Loco River, were all built in this style. Use of this style varied among the other ceremonial centers. In some ceremonial centers such as Cerro San Isidro and Virahuanca Bajo North, its use was limited to few buildings out of the whole complex.

During Period III, the ceremonial center of Huancarpón has buildings with megalithic masonry, however it is very likely that these were structures built in the previous period. In general, I suggest that megalithic buildings were not built during Period III.

The use of megalithic architecture was thus not consistent in the survey zone. Considering the larger investment of labor that this masonry requires, a purpose may have been impressing spectators. The location of this elaborate architecture: corners, platforms and doorways, made them unavoidable when people participated in the rituals, and in some cases, they were visible from far away. Consequently, it is likely that this tradition was the material expression of a community's prestige, and potentially a symbol of the power of their leaders. For instance, the megalithic Virahuanca Bajo North center mound at SLC 212 does not impress by its modest dimensions, but its stonework would have been impressive to anyone close by or participating in rituals there.

Table 8-16 Presence of megalithic architecture in the ceremonial centers in the survey zone.

Period	District	Site Name	Presence of Megalithic Architecture
I	101	Nuevo Moro 4*	No
I/II	201	El Algarrobal 4*	No
I/II	202	San Juan	Yes
I/II	205	Paredones	Yes
I/II	207	Anta	Yes
I/II	211	Quisque Bajo	No
I/II	non-SLC	Virahuanca Bajo South	No
I/II	non-SLC	Complejo Quisque*	Yes
II	201	Kushipampa	Yes
II	202	El Molino-Motocachi	Yes
II	203	Cerro Motocachi 17*	No
II	204	Cerro Chacuas Cucho 5*	No
II	205	Cerro San Isidro	Yes
II	206	Cerro Motocachi 8*	No
II	207	Vinchamarca	Yes
II	208	Virahuanca Cerro	No
II	210	Cerro Pimpon 3*	No
II	211	Quisque Bajo	No
II	212	Virahuanca Bajo North	Yes
II	non-SLC	Complejo Quisque*	No
II	non-SLC	Virahuanca Alto	Yes
III	302	Huancarpón	Yes
III	305	Chacuas Cucho 1*	No

8.7 SUMMARY AND DISCUSSION

The major ceremonial center in each supra-local community, and the largest outside these political units were analyzed and compared to explore how patterns of power relationships, and therefore leadership, were materialized in these centers.

The only ceremonial complex of Period I, Nuevo Moro 4, was located in district SLC 101. This complex contained mounds in a U-shaped layout and oriented toward the Nepeña River headwaters. This architectural pattern is similar to the U temples described for the Middle Formative Central Coast (Burger and Salazar 2008; Williams 1978), and Late Formative North and North Central Coast and Highlands, including in the Nepeña Lower Valley (Dillehay 1998; Rick 2013; Sakai and Martinez 2010; Shibata 2014).

Despite the paucity of households in proximity to the ceremonial center, the inferred plaza (the rectangular space between the lateral mounds) would have been capable of hosting the population of the entire survey zone during large scale aggregations. Moreover, the labor invested in its buildings suggests that people from outside the survey zone would have participated in the construction of the mounds. Thus Nuevo Moro 4 fits both the characterizations of Formative Period centers as “empty ceremonial centers,” that is, as a location only populated during ceremonies (Helaine Silverman 1994), and as centers for regional-scale population integration through face-to-face ritual aggregation (Burger 1992; Ikehara and Shibata 2008; Rick 2008).

Leaders were living, in average, closer to the U temple than the rest of the population, but there is nothing to indicate that they could have exercised control over the center. However, the massive aggregation occurring in the ceremonial center would have been propitious moments for the exercise of leadership, by either organizing the labor for the maintenance and the rebuilding of the monument, or by organizing the ceremonial activities.

The disintegration of the Cupisnique-Chavín Religious Complex was manifested in the survey zone by the abandonment of Nuevo Moro 4, and the demographic fragmentation of the population. A new set of ceremonial centers were begun, some of which were never finished, or not finished according to the original design. Although most of the unfinished projects share similar features with the U temple of Period I, such as their horizontal layout, their location in flat and accessible terrain, and having plazas for supra-district scale aggregations, they were also highly variable. Large enclosures isolated from other components were planned in what would later be supra-local communities SLC 201 and 211. In San Juan and Paredones a new architectural tradition – the mound-enclosure complex or Kushipampa tradition – appeared. Despite its unfinished state (incomplete walls and partial mound-filling), the general

distribution of architectural features at San Juan resembles the Kushipampa layout: large plazas and low platforms distributed in an orthogonal layout.

Paredones (PV31-64), built in the bottom of the valley, was the ceremonial center with the largest plaza in the survey zone. It was mostly finished, but, the lack of dense occupation surrounding it, the unfinished state of the southern wall, and the existence of expedient walls blocking entrances and channeling movement, suggest that, in some moment, the purposes of the public spaces had changed toward a more restricted usage.

Two ceremonial centers of the Enclosed Mound type were also begun and not finished. The first, Anta (PV31-170), was built on a low, partially eroded, alluvial terrace, inside the boundaries of SLC 207. The second, Virahuanca Bajo South (PV31-351), was located outside and to the south of the boundary of SLC 212. For each center, only the foundations of the walls were laid, the mounds were only partially filled, and evidence of associated residential occupation is lacking.

Quisque is the last of the unfinished projects of this transitional I/II epoch. It was built on the slope of the hills that divide the middle from the lower sections of the valley. From this location, most of the lower and middle valley is observable, giving strategic oversight of intravalley movement and communication routes. As with some of the other unfinished projects, Quisque was initially begun with megalithic masonry. But in contrast to the other buildings of the epoch, it was designed as a fortress, with bastions and angles in the external walls that facilitated defense against attackers. Despite the large amount of energy and resources invested in this building, it was not finished. New walls and a tower of small cut-stones were expediently built. It seems possible that defensive needs urged abandonment of the original design, with its impressive megalithic walls (Figure 8-1).

Despite the incomplete state of Paredones, San Juan, and the fortress at Quisque, the amount of labor invested in these respective structures indicates the use of labor pools that must have included people from other districts, unless an extraordinarily high labor investment was made by each district's residents. Even in the cases of Anta and Virahuanca Bajo South, where only the early stages of construction are manifested, the layout indicate ceremonial centers of large dimensions, and it is very likely that for their completion, similar aggregation of labor pool at supra-district scale must have been required.

I suggest that these projects were abandoned because they represent failed leadership, or even leadership strategies, during Period II. The architecture at each resembles suggests continuities with Period I (Late Formative) public architecture, including shared, horizontal emphases (highlighting the importance of ceremony in stage-like plazas), and a location far from population nucleations. However, a

series of changes modified the conditions in which ceremonial centers acted to integrate supra-local populations. First, the disintegration of the Cupisnique-Chavín Religious Complex removed part of the ideological foundations of Late Formative ritual practices. Second, the demographic explosion and the subsequent demographic fragmentation of the Valley, modified the social and political landscape in the Valley.

During Period I, periodic large-scale population aggregation in the single center (and some of those unfinished centers) may have served to loosely integrate people otherwise dispersed in small hamlets and villages. However, the multifold population increase during Period II also led to the formation of large, dense settlements of hundreds of people. The increased communal face-to-face interaction may have lessened the role of large-scale aggregations in the great centers of the Late Formative type. In addition, I hypothesize that the Period II increase in population density would have dramatically augmented the density and nature of social interaction. As I argue in Chapter 9.0, the population increase would have been likely to generate increased political competition and conflict. In consequence, a trend would have emerged in the communities that was the opposite of that of Period I. Instead of a steady or increasing interest in enlarging social networks by ritual aggregation, Period II communities and leaders would have put their interests into defining political boundaries, and the identities of their own groups. One way to do this could have been investing resources and energy in the construction of their own ceremonial spaces, sometimes with distinctive architecture, and oriented towards their own leadership strategies and populations. This demographic and political fragmentation of the region would have been a serious limitation, and even an impediment to, the formation of multidistrict labor pools, and consequently made these projects impossible to complete.

The abandonment of these Period I/II projects was accompanied by the consolidation of a few centers that were probably already in use (such as Kushipampa), and the construction of new ones (such as the hilltop complex in Complejo Quisque) that were intensively used until the end of Period II.

Among the most important changes in monumental center location was a shift from open and flat terrain to more defensible locations, such as hilltops and hill slopes. The surviving Period II centers differed architecturally with an increase in the depth (or a reduction in accessibility) to ritual spaces, and in exhibiting smaller open spaces, indicating use mainly by local-scale crowds. These two shifts suggest an increase in control of access to sacred spaces, and also the materialization of ritual inequality in the population as not everybody could have been accommodated at once in these spaces.

In addition, the tendency toward higher degrees of height or verticality in monumental design could indicate an increasing importance to mound building. That they were located in hilltops is an

indicator not only of increased need of defensibility, but also of a desire to boost the visibility of the monument in the region. Thus, these monuments may have been not only the loci of ritual practices but also the symbols of community organization and power.

While some of Period II public centers showed some continuity with the monumental layout patterns that emerged during the transitional Period I/II, other Period II centers were manifestations of new ritual and political practices. As a whole, the Period II centers exhibit even more variability than the I/II centers.

The ceremonial center of the SLC 201, Kushipampa (also known as Siete Huacas or PV31-56) is the most elaborate example of the Mound-Enclosure tradition: large cut-stones were used to build massive and impressive doorways (also visible at Paredones) and at enclosure corners. The edges of these large stones were carefully smoothed and rounded. Plazas were arranged in a hierarchical manner, providing access to mounds arranged in a L-shape (Ikehara 2010a).

Unlike at Paredones or San Juan, at Kushipampa a large, densely town developed to the south-east side of the monumental area (Ikehara 2010a). The quality of the extant residential architecture indicates that higher ranked families were residing here. In fact, here in district SLC 201, was the only instance of higher ranked households exhibiting a clear spatial association to ceremonial spaces (and access to them) in comparison with lower ranked households. Perhaps not coincidentally this is also the ceremonial center with the finest megalithic architecture, suggesting an effective management of labor. In contrast to the Period I center of Nuevo Moro 4, at Kushipampa, most of the construction labor pool and most of the using audience (as indicated by maximal open space size) would have come from the surrounding district population.

The ceremonial center in SLC 202, El Molino-Motocachi, is another example of the prior tradition. The buildings here were arranged in an orthogonal layout, not taking into account the natural topography of the hill. The mounds and platform were built with megalithic masonry that resembles very closely Kushipampa's constructive style, but with more emphasis on height. The vertical emphasis was the result of the use of a hill as base, as well as the construction of several tall mounds. The amount of labor that was required to complete these buildings would have surpassed any other Period II ceremonial center, even the more extensive Kushipampa. Unless the population of the district provided an inordinate amount of labor to the center's construction, labor pools drawing from neighboring districts would have been a requirement for building El Molino.

Multiple plazas of different size were located between the mounds, and it is very likely that plazas in both, El Molino and Kushipampa, were used sequentially during rituals in processional ceremonies

(Moore 1996c). I suspect that the community that built and abandoned San Juan (PV31-47) also built El Molino. The distance between them is just 800 meters, but the latter occupied a more defensible location than the former.

Six districts (SLC 203, 204, 205, 206, 207 and 208) had ceremonial spaces organized as hilltop complexes, mainly distributed in the central part of the Moro Pocket. The spaces in these centers were not laid out or oriented in a very cohesive way, and they were probably built during the growth of the associated residential areas. The variance in spatial correlation between ceremonial and demographic centers, the variability in architectural styles, the relatively small plaza sizes, and the variability of monumental height or verticality, support the hypothesis that each of these ceremonial centers belonged to an autonomous or semiautonomous communities. In most cases, the amount of labor that was required to build each of these public spaces, and the audience for these spaces, could have come completely from the local, district population.

A different kind of ceremonial center was SLC 210. Unlike the other centers, this can be considered an elite residential compound. Although in many ways it resembles a Late Intermediate Period site, the majority of the surface pottery dated to the Final Formative (Period II). It was built atop a hill, and includes multiple plazas, patios, and rooms. The top of the hill has several platforms and mounds in a lineal arrangement, and the rest of structures were orthogonally arranged on the northeast slope. The plazas were small in comparison with other ceremonial centers, and their quantity and distribution suggest that rather than being used sequentially, each may have belonged to an individual social group. The other rooms were too small to be patios or plazas, but much larger than most of the dwellings for this period in the survey zone (with the exception of some higher ranking housing at Kushipampa). I believe that these were also residences of higher ranked families. The spatial relationship between plazas and higher ranked families houses suggest that this leaders dominated, if not controlled, some of the public ceremony in SLC 210.

The ceremonial center of Virahuanca Bajo North, to one side of the demographic center of SLC 212, is unique in many ways. First, it is in the category of Enclosed Mound Complex. Second, it is the only Period II center located in a clearly, non-defensive location. And, third, this complex has a strong expansive or horizontal emphasis, indicating the importance of large plazas settings for ceremony. All these characteristics suggest a different ritual practice at SLC 212, and thus by ceremonial leaders, in comparison with other districts Period II. In fact, the analysis of audience sizes suggests that leaders of SLC 212 were probably the only ones in Period II trying to maintain political practices involving the

widening of social networks through large-scale aggregation of dispersed households, or households of other districts.

During Period II, some groups in the western half of the survey zone were performing public ceremonies in fortress settings. Only one of these fortress – temple groups was within a district. The others were associated with small, extra-district loci of population nucleation occupying highly defensible locations. A particular interesting case is Complejo Quisque. After or during the expedient remodeling of Quisque, the population built a larger complex at the top of the same hill. This complex was protected by several layers of defensive features including perimeter defensive walls on the lower part of the hill. Despite the enormous investment of labor, the newer buildings were constructed with megalithic masonry. These ceremonial centers (Quisque Bajo, Virahuanca Bajo North, Complejo Quisque and Virahuanca Alto) would have required the combined labor of households multiple districts. This requirement suggests a kind of regional cooperation proposed for Period I, and seen in the design of some of the failed Period I/II projects. That the monumental centers (and their labor requirements) reached beyond the boundaries of the supra-household communities suggests a level of ceremonial integration in the valley that was not isomorphic with the boundaries of the dozen Period II districts.

By the end of Period II many of the ceremonial centers were abandoned. Population in the survey zone dropped rapidly, and what was left was concentrated in the eastern section of the survey zone. In Period III, public ceremonies were centered at two locales. SLC 301 does not display any clearly identified plazas, but the flat terrain may have served for large gatherings. In SLC 303 and 304 people continued living in the same settlements as in Period II, but it is not clear that they were using the same monumental architecture.

In district SLC 302, Huancarpón (PV31-59) became the center for public ceremonial activity, replacing Kushipampa (PV31-56). Because Huancarpón has megalithic masonry, and a lineal arrangement of mounds and plazas, similar to the Early and Middle Formative Period sites in Casma (Burger 1992; Shibata 2004), I hypothesize that an earlier component, may exist within this ceremonial center. Regardless of the real antiquity of the oldest components at Huancarpón, it underwent extensive remodeling during Period III. The northeastern portion of the site was isolated from the rest by the excavation of a dry moat, and walls were erected to enclose the monumental core. These walls separated the plazas from the mounds. We can hypothesize that in Period II Huancarpón could have been similar to a Period II hilltop ceremonial complex. During Period III it was transformed into a fortified village. Access to the plazas during Period III was very restricted, and no large mounds were built during

this epoch. Consequently the moderate expansive/horizontal emphasis of this ceremonial center was probably inherited from an earlier design.

The other major Period III ceremonial center was Chacuas Cucho 1, located inside SLC 305. In this district, a descendant of SLC 204, the focus of public ceremonial activity was moved from the slope facing the valley to the higher ground of a mountain, facing the highlands. The settlement, which congregated a large portion of the Middle Valley population during Period III, was protected by a system of fortresses (very likely built during Period II) and extensive defensive walls. The larger plaza was located on the flat crest connecting the two peaks of the mountain and accessed by following the ridge coming from the valley, the ridge coming from the highlands, or, with more difficulty, from the slope and dry quebrada facing El Arenal. The unique feature of this plaza is the existence of a standing stoned or *huanca* in its center. Access to the innermost plaza was very restricted, requiring the visitor to navigate a series of platforms and smaller plazas at different elevations. This layout suggests a highly controlled access to the key ceremonies in this settlement.

Both ceremonial centers (Huancarpón and Chacuas Cucho 1) were located at the demographic centers of their districts, following the trend started during Period II. These local populations were the labor pool used in the construction of these monumental centers, and in the adaptation of older buildings to new ceremonial/defensive requirements in Period III.

The analysis of audience size reveals that these two centers were used for different kinds of ceremonies and population sizes. Huancarpón's plazas could have gathered people of several districts (around 70% of the population of the survey zone), while Chacuas Cucho 1's plaza was designed to host a small audience, very likely equivalent only to the local population of SLC 305. The differential importance of ceremonial spaces in each district were reflected in the interest of leaders that lived close to them. In SLC 302, leaders were living much closer than other people to Huancarpón, while in SLC 305 there is no significant association between the monumental architecture and higher ranking household locations.

In sum, changes in the monumental ceremonial centers denote a significant transformation of leadership over the three periods. Between the Late Formative (Period I) and the Final Formative (Period II), was an abandonment of the tradition of supra-district aggregations, increasing restriction to ritual spaces (in both physical and social accessibility), and increases in the number and diversity in ceremonial centers. These are indicators for Period II of: a) the end of patterns of ceremonial leadership that existed in the Late Formative; b) increased variability in how ritual leadership was exercised; c) multiplication in the number of leaders; and d) reliance of ceremonial leadership strategies on local (district) social networks. In contrast, the transition to the Early Intermediate Period (Period III) was characterized by a

reduction in the number and variability of ceremonial centers. Two complementary ceremonial complexes were located inside fortified villages, one capable of hosting supra-district audiences, the other with a smaller capacity. This shift suggest a reduction in the number of political units and a loss in leadership diversity.

9.0 CONFLICT AND WARFARE

Many scholars have emphasized the use of coercion in the construction of authority, and the role of warfare in the formation of complex political systems (Carneiro 1970, 1998; Earle 1997; Haas 2001; Keeley 1996; Kirch 1984; Mann 1986; Webster 1998). However, more recent approaches view conflict, violence and warfare as a more complex social category related to many aspects of life (Allen and Arkush 2006; Arkush 2011; Solometo 2006). For instance, while in some historical contexts warfare has indeed boosted the power of leaders and rulers (Earle 2002; Ferguson and Whitehead 1992b), in others cases, it was an obstacle to regional political consolidation (Allen 2008; Arkush 2011; Earle 1997).

Warfare is considered in this section as violence between groups (Ferguson 1984; Kelly 2000). Current research has intensified an intensification of inter-group conflict in the North Coast of Peru by the end of the Late Formative Period (Arkush and Tung 2013; Billman 1999; Brown-Vega 2009; Chamussy 2009; Ghezzi 2006; Ikehara and Chicoine 2011). This phenomenon has been explained as the failure of the Chavín ideology to shape non-coercive relationships between these coastal communities (Burger 1992), or as the result of the arrival of highland immigrants with different cultural traditions (S. Pozorski and Pozorski 1987). An alternative perspective is offered by Topic and Topic (1997) who consider that these archaeological evidence reflects an earlier and more complex version of ritual battle or *tinku*. Some elements of their argument have been contested by Arkush and Stanish (2005).

Recent studies focused on warfare in the Ancash - Nepeña Valley region have been based on the excavation and detailed mapping of fortresses (Brown-Vega 2010; Ghezzi 2006). Although this research has provided information on the antiquity and use of these structures, it has largely missed or only treated tangentially one very important question: Who were the groups in conflict? The objective of this chapter is to answer this question in order to understand the role of conflict and violence in the emergence of new leaderships and in the political reconfiguration of the Middle Nepeña Valley after the decline of the Cupisnique/Chavín Religious Complex.

9.1 CURRENT MODELS OF THE NATURE OF EARLY CONFLICT IN THE PERUVIAN NORTH COAST

In his 1970's model, Carneiro delineated a trajectory of state formation based on the particular environmental characteristics of some regions, including the Peruvian coastal valleys. He predicts that, in a circumscribed territory, demographic growth will increase the pressure over resources, and competition and conflict would emerge. Conquest and alliances would permit some villages and polities to take over neighbors, until gradually the whole region would be unified under a single hierarchical political system (state).

Some research in the North Coast, suggest that regional unification resulted not from this gradual conquest of neighbors, but from cooperation between local groups against external threats. Wilson (1987)'s and Daggett (1987)'s reconstructions of the trajectories of the Lower Santa and Nepeña Valley, respectively, suggest that supra-local organization emerged as response to external threats. Wilson considers that resources were more than sufficient, and local geographical conditions boosted inter-village cooperation reducing the probabilities of internecine conflict, rejecting Carneiro (1970)'s original model.

In the Nepeña case, Daggett hypothesizes that hilltop sites were residences, refuges against attacks, and were used to control the communication routes. In contrast, for the Moche Valley, Billman (1996) considers that the construction of fortifications and the clustering of settlements during the Salinar Period (Final Formative) were the result of intra-valley conflict, however, during the Gallinazo Period, a settlement hierarchy emerged in the valley in a context of conflict with external groups.

The previous accounts approached warfare as a monolithic variable, which study usually was carried out in the binary opposition between internal and external conflict. This view limits the understanding of conflict and warfare as a multilayered phenomenon in which alliances, ethnic identities and political affiliation result from practical decisions shaped by specific historical moments (Arkush 2014; Gearing 1958), and not necessarily from long-term strategizing of power-seeking individuals.

Consequently, in this section I explore the characteristics of conflict in the Nepeña Valley, considering that the archaeological landscape of violence (fortification, fortresses and defensive locations) could be the overlay -a palimpsest- of multiple layers and vectors of interaction.

9.2 ANALYZING THE CHARACTERISTICS OF THE WARFARE

People can confront the threat of violence in multiple ways. The amount of their effort in defense - including the construction of costly fortifications- is a response to the social scale, tactics, goals, and the intensity (frequency, predictability and the duration) of the threat or expected confrontation (Arkush and Stanish 2005; Arkush and Tung 2013; Keeley 1996; Solometo 2006).

The scale refers to the size of the war parties involved in the confrontations (Solometo 2006). Large armies can be gathered by large communities, but also by means of cooperation between political units under alliances or pacts. Aggregation of population may be an initial response to the threat of attack, but if the scale increases, the addition of extra layers of defense may be required, such as the implementation of settlement defenses and the construction of fortresses.

Tactics and goals refer to the way warfare were carried out, who were the target of the violence, and the technology available for the confrontations (Solometo 2006). Some kinds of conflict are heavily focused in status rivalry, in which leaders compete for prestige in battle. Most of the population are not involved in the confrontation, but they can be targets of attacks if rewards can be obtained (i.e. slaves, victims for sacrifice or trophy-heads) (Keeley 1996:86). Combats are usually hand-to-hand and elaborate costumes may be used to highlight the status and prestige of the combatants (Keeley 1996). If the targets are mostly combatants and leaders, fortresses may be of small size, only to provide advantages to the defenders, and not to serve as refuges for the whole population. Another way to avoid harming non-combatants involves to take the battles off the settlements, but in this case, it may require conventions of war shared by all the parties in conflict. In contrast, in a total war, the whole population may be involved –and are targets- in the war effort, and a diverse array of tasks are carried out to supply the campaigns.

The defensive infrastructure and the tactics depend strongly in the technology of weaponry used by the enemy. No fortification is built for technology or tactics that are not used (Arkush and Stanish 2005:7), and consequently the analysis of them may indicate how combats were carried out. When new technology is invented, fortifications must adapt, as it occurred with the introduction of gunpowder weaponry in the Old World (Keeley, et al. 2007).

Even if other variables change or not, the frequency and predictability of the confrontations is one of the main factors that influence the decision of how much energy is used to build defensive infrastructure. When conflict is infrequent, rarely people would move to more secure places or build fortifications (Solometo 2006). If conflict escalate, and involve more frequent raids between small groups, the first reaction is to settle close each other (population clustering or aggregation), sometimes in highly

defensive positions (ridges and hilltops) facilitating the defense of the community. If the scale or size of the parties increases at the same time than the frequency and the duration of the conflict, fortifications may be a worthwhile investment for the long term survival of the community. Solometo (2006) reminds us about the importance of the predictability of the encounters, because if attacks cannot be predicted with enough time in advance, some solutions such as hilltop refuges may be useless. A system of outlooks may serve to increase the early detection of attacks, but also the imposition of cultural norms such as war declaration or ritual cycles.

Finally, the direction of the violence is reflected in settlement patterns, the location of the defensive structures and the presence of buffer zones. Antagonistic groups avoid themselves, and it is advantageous for allies to live close each other (LeBlanc 2006). The aggregation of population creates patches of low occupational density, which could be transformed in no-man territories of buffer zones if the conflict escalates. Buffer zones, while disadvantageous in economic terms (Kelly 2005), permit an early detection of attacks and the subsequent preparation of the defense (LeBlanc 2006). Consequently, these zones are usually located between enemy groups.

Fortresses and outlooks can be placed in strategic positions to secure communication routes, but also close to settlements, being used as places of refuge. Paths and roads can be used to mobilize war parties, and consequently, attacks can be prevented by blocking or controlling these routes with the construction of walls. Systems of several walls permit to slow down the enemy but also to divide large parties in smaller ones giving strategic advantages to the defenders.

In sum, the characteristics of conflict and warfare in the survey zone in each period under study is analyzed by the use of the size and distribution of the population, the location and type of fortifications, the evidence of weaponry recorded in the survey zone as well as iconographic evidence from contemporaneous sites (Table 9-1).

Table 9-1 Summary of archaeological proxies for the analysis of the characteristics of warfare.

	Archaeological Proxies					
	Demographic Patterns		Fortifications		Other	
	Size	Distribution	Location	Type	Iconography	Weapons
Scale	x			x		
Tactics and Goals		x	x	x	x	x
Frequency		x	x	x		
Predictability		x	x			
Direction of Violence		x	x		?	

9.3 CONFLICT AND VIOLENCE IN THE SURVEY ZONE

9.3.1 Period I

Clusters of few to several dozens of households were distributed through the survey zone and organized in two supra-local organizations (Figure 5-9). The largest cluster, the demographic center of SLC 101, in Cerro San Isidro and its surrounding area, consisted in almost one third of the total population of the Moro Pocket, and it was located in the middle of a large patch of cultivable land. These clustering could be the result of labor needs for farming (Drennan 1988; Stone 1993). Indeed, the proportion of households living in the cultivable soils (13%) is much larger than in the following periods (Figure 7-4), but the labor requirements of this economic activity does not explain why most of the population lived in hills and mountain slopes. Another hypothesis is that living in elevated terrains permit households to avoid annual summer river floods, but also to avoid other discomforts of lower elevations (Daggett 1987:79-80). A third alternative is that all these factors, with an additional concern on defense, were into consideration when people decide where to build their residences.

The interpretation of the results of the analysis presented in Chapter 5.0 indicates that most of the households were organized in two districts, so dissimilar in size that the largest one, SLC 101, may have exercise a clear demographic dominance over the smaller one. Economic (Chapter 5.0) and ritual integration (Chapter 8.0) may have shape the relationship between local groups, while leaders' participation in a multi-regional network of elite solidarity (The Cupisnique-Chavín Religious Tradition), may have shaped the interaction with communities outside the survey zone, alleviating or limiting the chances of the generation of high intensity, frequent and large scale inter-group violence.

In no region of the Central Andes, including the Nepeña Valley, fortifications have been securely dated to this period, being iconography the only evidence of the use of weapons (Arkush and Tung 2013). Late Formative iconography found in buildings and artifacts in other contemporaneous Middle and Late Formative centers, including Chavín de Huántar, evidences the existence and use of spear throwers (Rick 2013:Fig. 105). In addition, Larco (1941) has dated North Coast stone maces to Cupisnique (Figure 9-1). The supernatural character of the weapons holders, their elaborate dresses, and the context of the art, suggest a highly ritualized use of violence, probably in the context of status display and competition (Arkush and Tung 2013:322-323).



Figure 9-1 Maces assigned by R. Larco as Cupisnique (Middle-Late Formative) (Larco Museum in Lima: (a) ML 300064, b) ML 301322)

9.3.2 Period II

During this period, the Cupisnique-Chavín rituals were no longer practiced, its related ceremonial centers were abandoned, and, in the Nepeña Middle Valley, the population surged abruptly. Local population reorganized in several supra-local polities with their respective ceremonial centers and with a variety of power strategies (Chapter 5.0). With the population surge, households continued aggregating, forming large and dense towns such as the demographic centers of SLC 201 (Kushipampa), SLC 204 (Chacuas Cucho) or SLC 205 (Cerro San Isidro). Household location favored areas far from cultivable lands such as hilltops and hill slopes, where access to water was limited. It has been hypothesized that warfare was an important factor for this locational pattern (Wilson 1988).

Defensive structures were built everywhere in the survey zone (Figure 9-2), and three general types can be identified: a) fortresses and/or outposts built in hilltops and ridges (N=37); b) settlement defenses protecting towns, villages and ceremonial buildings; and c) defensive wall systems, usually blocking natural pathways such as dry ravines or quebradas.

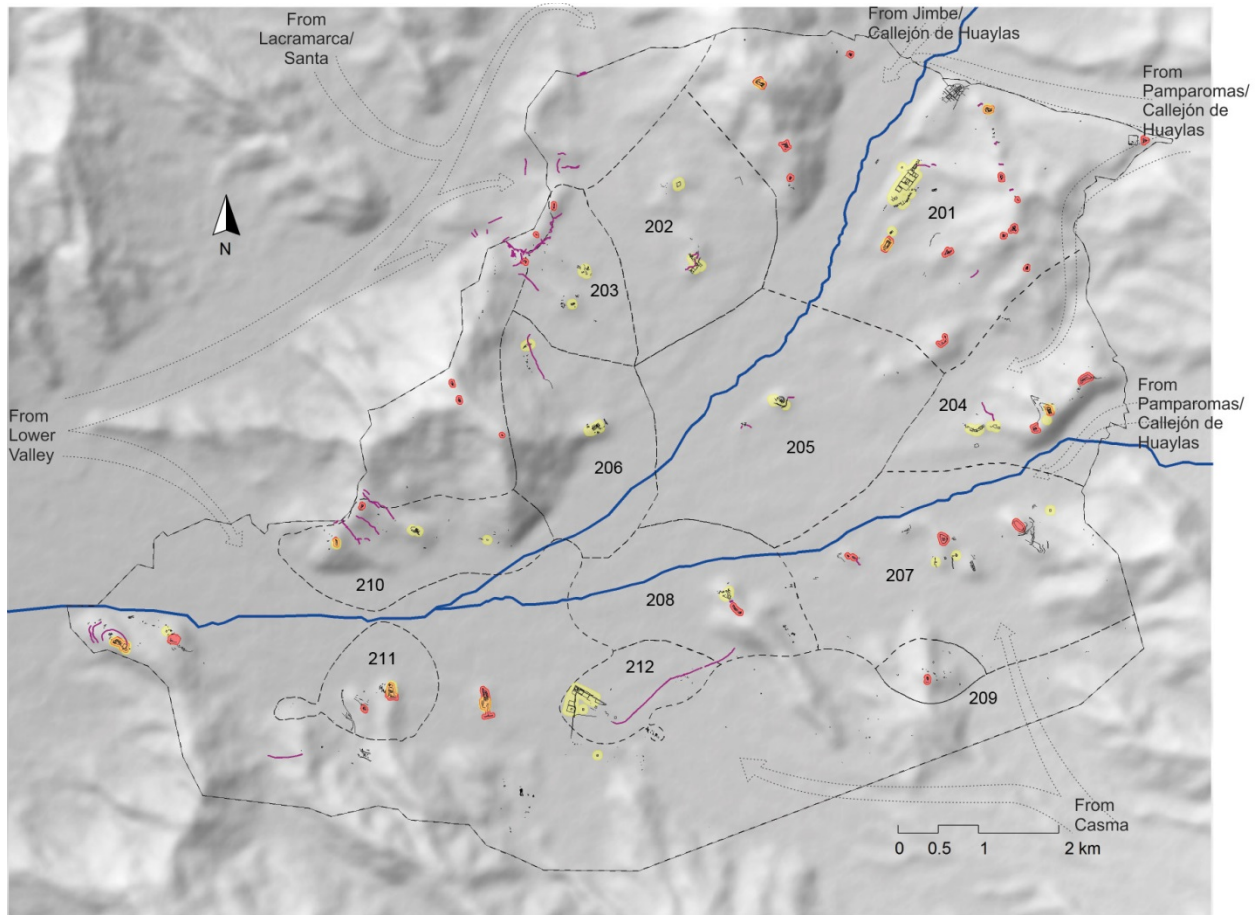


Figure 9-2 Period II districts, fortresses (red), ceremonial centers (yellow) and possible communication routes (arrows).

The settlement of Kushipampa, the demographic center of SLC 201, was built in an elevated alluvial terrace, however, its accessibility was not very limited by the topography. With the exception of the wall in the northeast -which blocks the access to the eastern quebrada from the north-, and a possible moat in the southwestern side, no other defensive features has been identified in the settlement. However, eleven fortresses with mutual intervisibility, four in the right side of the Nepeña River, and seven in the mountain at the east were forming a defensive ring around Kushipampa. Three fortresses identified in the north side of the El Arenal quebrada, may have form a first line of defense if attacks come from the east or southeast (i.e. SLC 204).

In contrast, the districts SLC 202 and 205, lack of fortresses, but their main settlements were fortified. In SLC 202, El Molino settlement, had defensive walls, built in expedited way, and breaking with the original orthogonal layout. Some hilltop platforms in the northern part of the ridge could have been

used as outlooks. In SLC 205, the San Isidro settlement had defensive walls, some of them with megalithic architecture, which impeded the direct access to the hilltop. Additionally, the adjacent site of Puente Piedra (Ikehara 2008), a megalithic mound with restricted access to its top, could have been used as a refuge in case of raids.

The demographic reconstruction in the survey zone indicates a relative demographic dominance of SLC 201 during this period. Just from inside this district around 600 warriors may have been called if needed¹³. However, this represents only the 28% of the potential warriors in the survey zone and provides only a limited advantage. For instance, a hypothetical alliances with the surrounding neighbors can gathered altogether an army of similar size. Any attempt to dominate the region must have included the creation of alliances between districts in order to increase the difference between contenders. Architectural similarities between the ceremonial centers of SLC 201, SLC 202 and SLC 205 may be an indicator of political affinity. If this scenario is plausible, then, in case of attack, these districts may have cooperated, and the weaker districts received support from the largest one, and even use their fortresses for their own defense. These three districts, altogether, may have controlled around the 46% of the warriors in the survey zone.

SLC 203 and 206 were demographically smaller districts located to the west of the previously discussed districts. Despite their relative small size, they were heavily defended. Six fortresses have been identified in the hilltops and ridges next to the major population clusters. In addition, a complex system of walls in SLC 203 blocked the potential pathways between the Quebrada Solivín –a natural access to the Lower Nepeña and the northern valleys of Lacramarca and Santa- and the Moro Pocket (Figure 9-3).

The defense of the communities in the rest of the survey zone, whether organized in districts or not, followed a different pattern. People were living in clusters of households protected by fortresses built adjacent to them. The largest one, the district SLC 204, was defended by three fortresses in the ridge of the Chacuas Cucho hill. The demographic center of this district was separate by three kilometers of low density occupation, the El Arenal dry quebrada, and two lines of defenses from Kushipampa, the demographic center of SLC 201. In contrast, only a little more than one kilometer, plus the Loco River (only impassable during the summer), separated it from the demographic center of SLC 207. This suggest certain affinity between these last two districts that became a single district in the next period (SLC 305).

¹³ Hassan 1981 cited by Billman (1999) indicates that one fifth of a population can be considered as potential members of war parties.

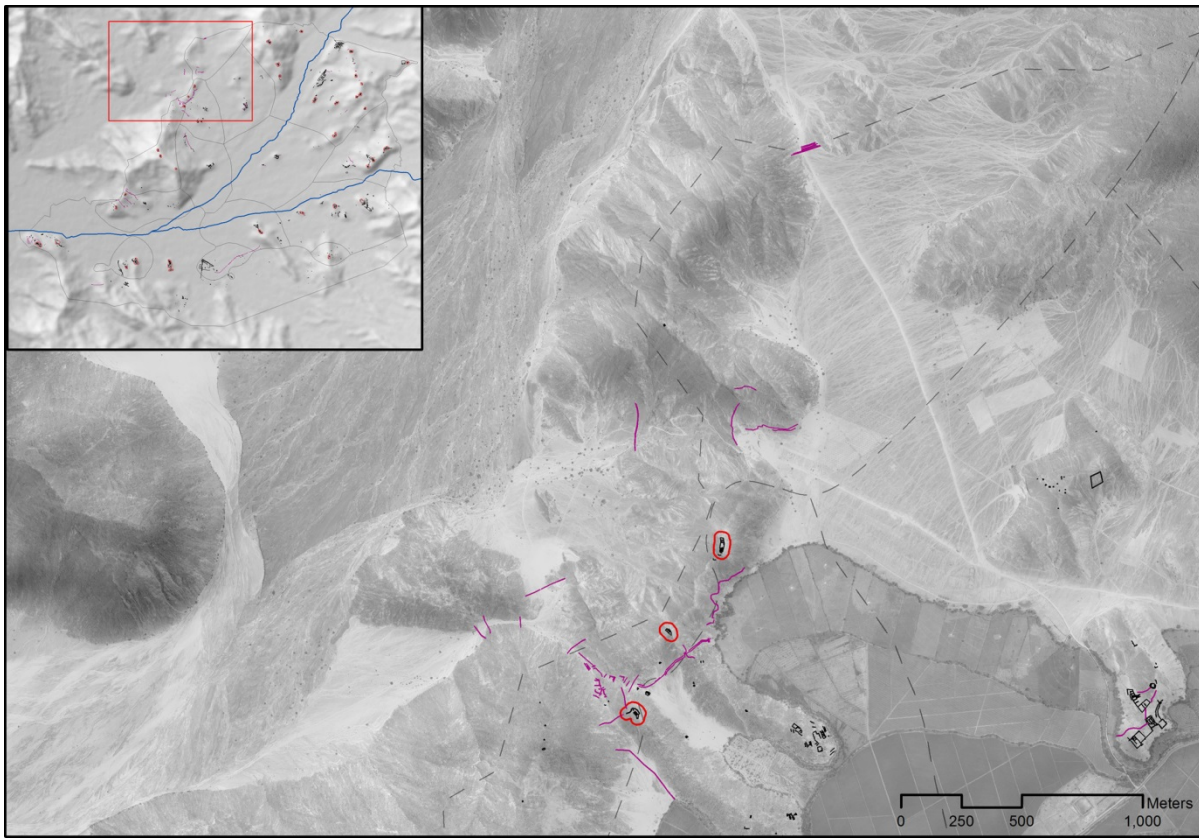


Figure 9-3 Detailed view of fortifications and defensive walls around SLC 203 during Period II.

SLC 207 was formed by three clusters of population, each one in a separate hill. Three fortresses were identified, and a fourth one in the east is inferred from walls below a Late Intermediate occupation. These fortresses may have served to defend each cluster of population, as also occurred with the small town of SLC 209 to the south, and the largest population clusters in SLC 208, SLC 211 to the west. A similar pattern is found for communities without supra-local organization. For instance, both the finished and unfinished projects of the Quisque area were associated to a population cluster, as well Virahuanca Alto settlement.

In the southern side of El Loco River, SLC 212 was the only district without nearby fortresses or fortifications. A hill is located half kilometer to the south, but not a single defensive structure was found on it during the survey. However, a large wall runs southwest to the northeast, blocking the access to the alluvial fan between the next hill and the main settlement of Virahuanca Bajo North. Dwellings and other structures were found along its way, and a probably gate was found halfway. I suggest that the minimum defensive investment in SLC 212 was the result of the continuation of an old political tradition consisting in extending their social network by investment in large scale ritual practices (see Chapter 8.0).

Consequently, instead of building fortifications they build political alliances. On the one hand, it could be a risky strategy because their leaders would direct only a small portion of combatants with no defensive infrastructure, but, in the other hand, the threat of attacks can be offset by the potential to amass a large army.

The location of the fortresses in the northern half of the survey zone indicates that it was expected that confrontations would take place far from populated areas (Topic and Topic 1997). These may occur in two situations: a) when there is a taboo or rule of war against attacking non-combatant population, as in some kinds of conflict in Hawaii (Kolb and Dixon 2002), and/or b) when attacks can be predicted with enough time in anticipation that permit people to run away to these places. Bioarchaeological evidence for this period, and the defensive emphasis in the settlements points against the first (Arkush and Tung 2013; Gillespie 1998). In contrast, the second option have some support from the current evidence. Some defense efforts in the settlements such as expedite walls and moats may indicate that attack could also occur against non-combatant, unless they were already in the fortresses, and only combatants remains in those places. The large populations of the districts SLC 201 and 205 may have discourage direct attacks to populated areas unless a rival can put together a large war party, and when it would occurred, the high visibility from the system of hilltop fortresses and outlooks may have detected such movement in advance.

In contrast, the location of fortresses close to populated areas in the rest of the survey zone indicates that: a) no coordinated effort for anticipate attacks were made, and/or b) attacks were unpredictable in time and direction. Both factors requires rapid responses to attacks, and having the people clustered around the fortifications helps in this effort. The hypothesis of political autonomy and certain level of violent competition between these communities is a plausible explanation of this pattern. The duration of the confrontations must have been short, considering the lack of water sources in the fortresses (Topic and Topic 1997). Long military campaigns, such as those described for the Inka expansion (D'Altroy 1992), require a high investment in infrastructure and technology not visible in the defensive structures of the Nepeña Valley during this time. In addition, Topic and Topic (1997:570) has consider that long distances from the fortresses to the agricultural lands and other properties, is an evidence against the hypothesis of warfare, because no economic gain resulted from victories. However, in the desert coast of Peru, water, and not land, was and still is the critical resource for agriculture activity. In fact, three of the most populated districts, SLC 201, 204, and 207 were located in areas where the irrigation systems can be controlled.

During the fieldwork, weapons were identified and recorded for this period in the survey zone. Polished stone points (finished N=20, preforms N=16) has been used as a diagnostic feature of this period (Daggett 1984). These points (Figure 9-4), usually made of shale or slate, may have been used as projectile' or dagger' points. Some examples of stone maces have been also found (N=7) but its temporal assignation to the Final Formative cannot be secured. In the present survey, and in previous research (Daggett 1984; Ikehara 2008), these weapons –points and maces- were found in or very close to fortresses, but also to ceremonial centers which, in most of the cases, correspond to the demographic clusters inside each district (Figure 9-5).



Figure 9-4 Example of polished slate/shale points from survey units a) 2525 and (b) 2836.

A complementary source on Final Formative weaponry is iconography. In the excavations of the fortress of Chankillo, in the neighboring Casma Valley, ceramic figurines of warriors (Figure 9-6) has been reported. These figures hold spear throwers, slings, maces, spears and shields (Ghezzi 2006). The elaborate costumes indicate that they were scenes of power display and exhibition in which warfare roles were important. However, as well as Moche iconography, a warning need to be issued about how well these images represent ritual or the real depiction of raids and battles (Arkush and Stanish 2005; Topic and Topic 1997).

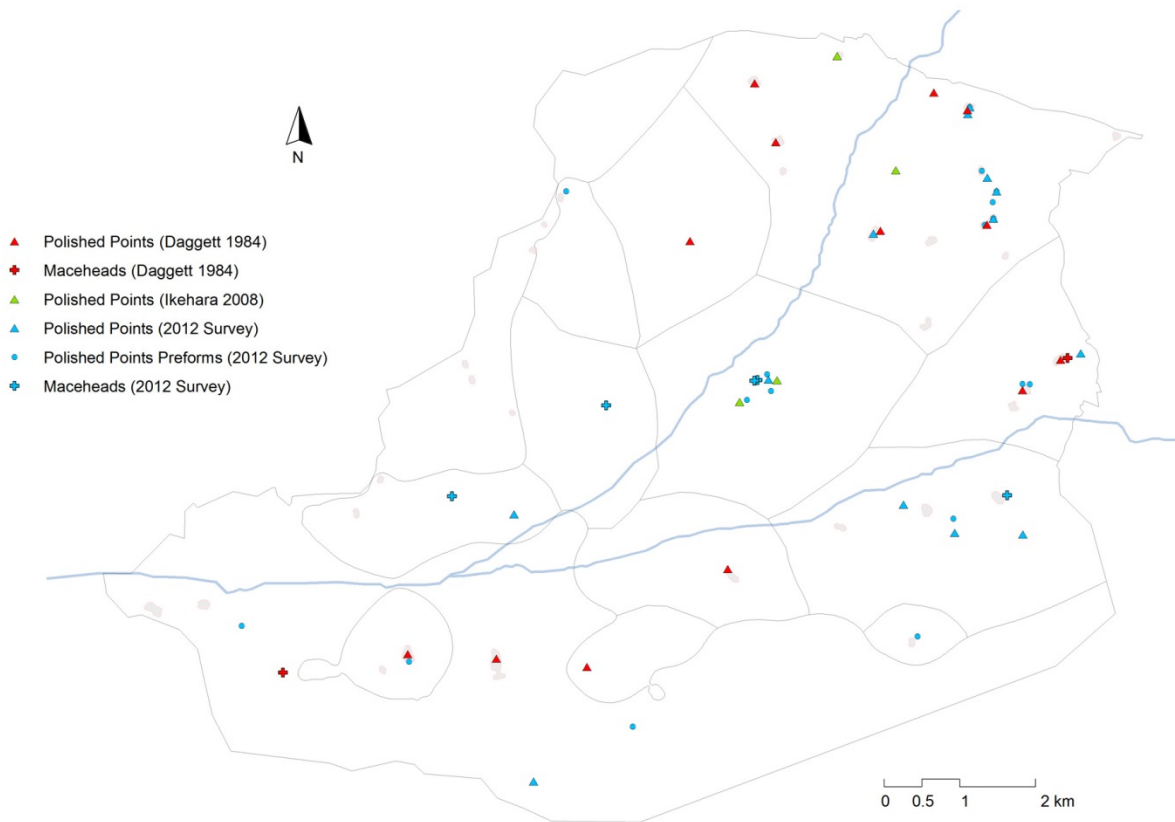


Figure 9-5 Map of the location of weapons in the survey zone.

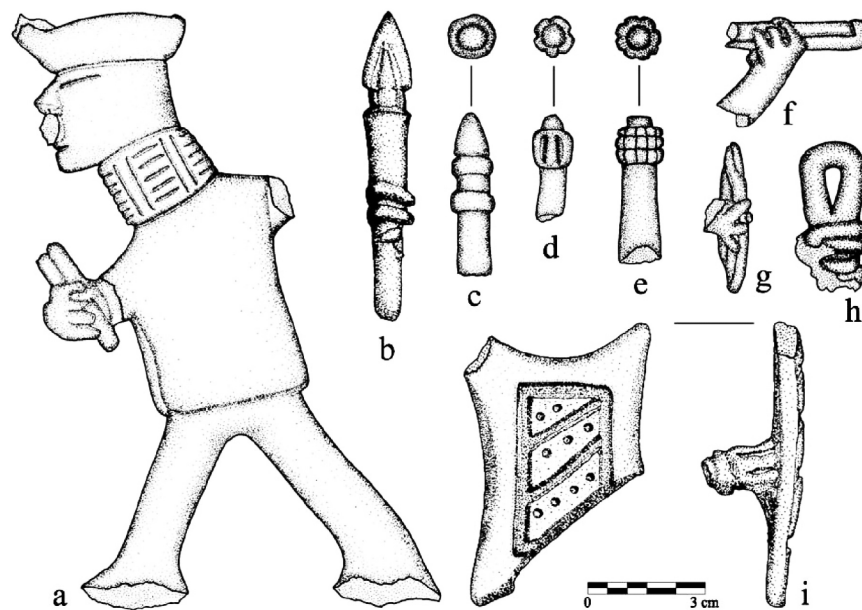


Figure 9-6 Ceramic figurines (a) with weaponry (b: spear, c-e: maces, f: spear throwers, g: dart, h: sling, i: shield) from excavations in Chankillo, Casma Valley (Taken from Ghezzi 2006: Fig. 3.4).

9.3.3 Period III

During this period, population declined drastically and concentrated in the eastern half of the survey zone. Most of the population were organized in two districts with fortified towns (Figure 9-7). The rest of the people were living in small districts and isolated hamlets with minimum investment in defensive infrastructure. Some of the fortresses continued to be occupied, but apparently no new major ones were built.

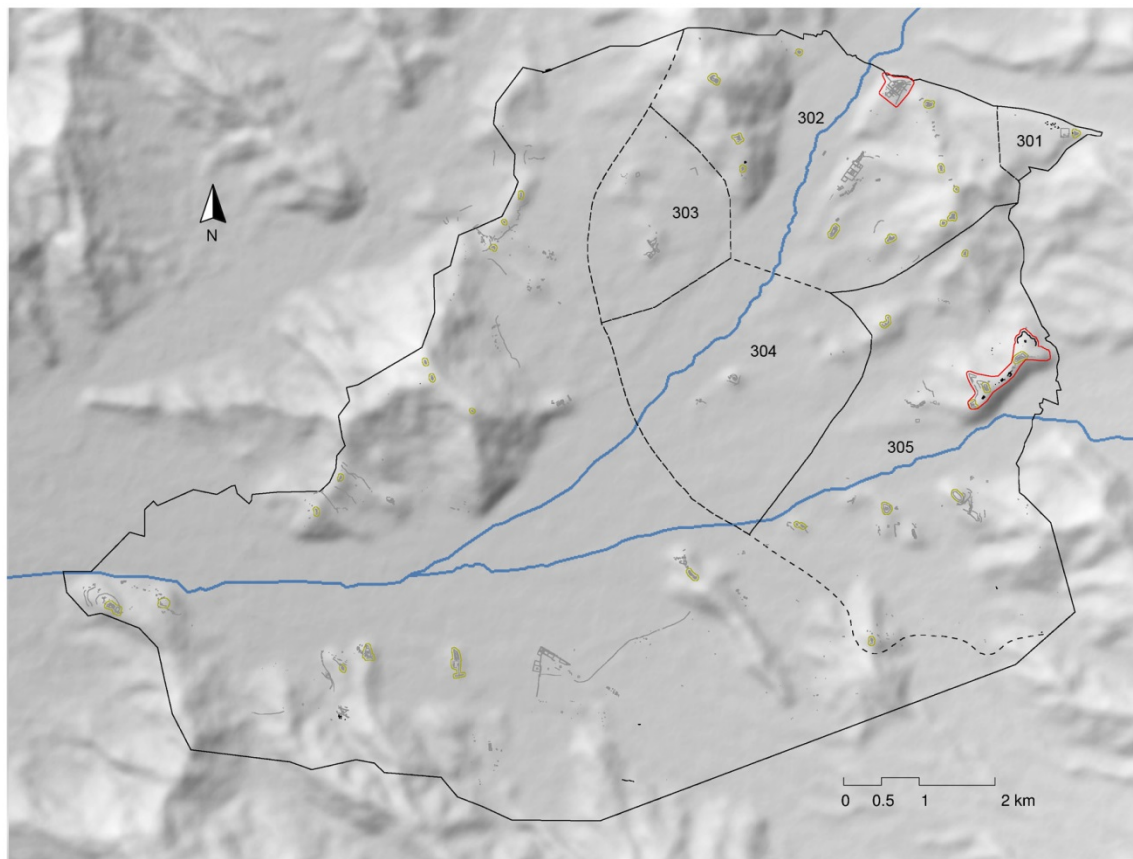


Figure 9-7 Period III districts, fortresses (red), ceremonial centers (yellow).

The district SLC 302 evolved from SLC 201, but the demographic and ritual center moved from Kushipampa to Huancarpón. This settlement was occupied at least since Period II, and during Period III it was exposed to major remodeling. The settlement was originally planned as a monumental core of aligned mounds and plazas, and surrounded by a village. During Period III, it was transformed into a fortified village. The addition of walls and moats subdivided the settlement and restricted considerably

the movement of people, but increasing substantially the defensiveness of it. The fortress immediately to the east continued to be used very likely to support Huancarpón defense in case of attacks.

SLC 305 was the demographically largest district during this period and it was formed by the merge of SLC 204 and SLC 207. The Period II fortresses in Chacuas Cucho and the adjacent towns were merged into a single settlement surrounded by a system of perimeter walls. This fortified village concentrated a large portion (around 27%) of the total population of the survey zone during this period.

In Chapter 5.0 , I showed that SLC 302 and 305 were somehow complementary districts. While SLC 305 was economically dominant by its larger population and ceramic production share, SLC 302 was ritually dominant by controlling the largest plazas, consuming more exotics and very likely concentrating the elite's burials. The other districts were very small and very likely economically, politically and militarily dependent of the largest districts (see Chapter 5.0). For instance, these two large districts may have controlled the irrigation systems in the survey zone, following a tendency observed in Period II. If during the previous period, architectural similarity suggest political affinity, during Period III, complementarity suggest a stronger link between these two districts. Together, SLC 302 and 305 may have politically consolidated the Moro Pocket, until its annexation to the Moche polity centered in Pañamarca.

These patterns of settlement and fortifications indicate a change in the characteristics of warfare in the region. Fortresses were not reliable anymore, and the fortifications of the settlements seems to be a better solution for a higher frequency and scale of the conflict (Arkush and Stanish 2005). During Period III conflict may have been part of daily life, and war leadership, once temporal and sporadic, may have become more permanent. However, the construction of permanent authority with military roles could involve assuming leadership responsibility even during peaceful periods. In such moments, war lords could remind their followers their critical role for community survival by the use of symbols.

Finally, iconographic evidence of contemporary Recuay and Gallinazo related groups from the adjacent Highlands and neighboring coastal valleys, depicted individuals in military roles and leadership (Figure 9-8). In contrast to the scarcity of Chankillo-like figurines, these warrior imagery were ubiquitous in the North Coast and Highlands, suggesting the institutionalization of military leadership inside a large number of communities (Lau 2011).



Figure 9-8 Early Intermediate Period Gallinazo style (a and b) and Recuay style (c and d) ceramic vessels with warrior depictions (a) ML016294, b) ML016299, c) ML029513, and d) ML031715).

9.4 LEADERS AND WARFARE

Situations of conflict are propitious moments for the rise of leaders. Indeed, it has been argued that periods of conflict can be perpetuated by the competition between warlords (Allen 2008; Arkush 2008; Earle 1997), which see their positions perpetuated indefinitely. In this section, two questions are assessed: a) Have leadership in the Middle Nepeña Valley benefitted from the situations of conflict? And b) How can the context of warfare make social inequality visible inside communities?

The best line of evidence to relate military roles and social rank are burials, in which the objects reflect individual roles in life, as well as group's perception on the deceased. Despite the usefulness of these contexts, we lack proper data on funerary patterns for the survey zone during the periods under scope. Excavated cemeteries in other valleys are poorly reported or show reduced numbers of associated remains. The few reported burial contexts in the Moche and Viru valleys (Chauchat and Guffroy 2003; Donnan and Mackey 1978; Strong and Evans 1952) have no information relating war roles and social rank, but moreover, it shows low levels of inequality in comparison with earlier or later periods. Then, so far, there is no supporting evidence from funerary contexts that leaders develop authority from their roles during war.

In the survey zone, I analyze the relationship between the presence of slate points (finished and preforms) (Figure 9-5) -the most ubiquitous weapon and clearly related to defensive efforts during Period II- and the rank of the households or group of households represented in each survey unit (Chapter 4.0). The results (Table 9-2) indicates that it is very unlikely that the presence of weapons is related to household rank ($\chi^2=1.27$, $p >0.5$). Consequently, this line of evidence does not support the hypothesis that participation in war was related to household rank in the survey zone.

Table 9-2 Weaponry evidence by household rank.

Rank	Slate Points ¹	Households ²
Null ³	1	35
1	0	15
2	0	4
3	1	108
4	24	1957
Total	26	2119

Notes:

1. Finished points and preforms.
2. Total population divided by five.
3. Survey units with a population estimate of less of 1 person per century (see Chapter 4).

Finally, I evaluate if higher ranked households have preference in accessibility to defensive structures. The comparison was made averaging the time taken to reach the fortresses and fortified towns by lower (Rank 4) and higher (Rank 1-3) ranked households, as defined in Chapter 4.0 . For this line of evidence, data is available for both Period II and III.

The results (Figure 9-9) suggest a dramatic change between both periods. During Period II, the high number of fortresses in the survey zone (N=37) permitted that most of the population had relatively easy access to defensive structures. Lower ranked households lived closer to these potential areas of refuges than higher ranked households. However, the difference is very small ($\Delta=4$ minutes, $p<0.01$). In contrast, during Period III, the population and most of the defensive investment were concentrated in the two large fortified town inside SLC 302 and 305 to the east. During this period, leaders had privilege protection against attack. The differences between higher and lower ranked households favored strongly and significantly the first ($\Delta=20$ minutes, $p<0.01$). This data does support the hypothesis that there were unequal access for protection against attack, but only during Period III. During Period II, everybody, despite their rank, everybody had relatively good access to protection.

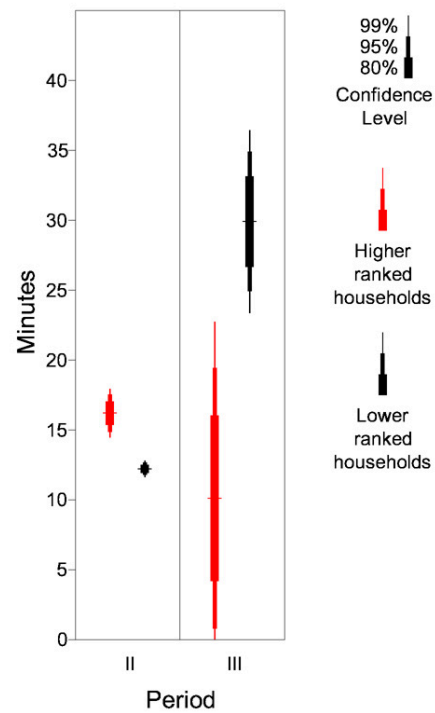


Figure 9-9 Comparison with bullet graphs of the distances to the fortresses/fortified towns of households according to their relative rank and weighted by population size for Period II and III.

9.5 SUMMARY AND INTERPRETATIONS

The iconographic and settlement pattern evidence suggest that violence during the Late Formative (Period I) was restricted to infrequent raids among local groups. These raids were likely carried out by small parties, in a highly ritualized context, and may have been based on the ideology of the Cupisnique-Chavín Religious Complex, whose iconography display supernatural beings holding weapons or hunting tools.

The evidence for the Final Formative (Period II) indicates that violent confrontations increased in frequency and scale, or that the threat of violence became a much more important consideration. The

Period II landscape can be read as suggesting several modes of conflict and vectors of interaction. More frequent encounters could well have kept a large part of the population in larger nucleations, and as the chances of an attack increased, the defensibility of many settlements was improved with walls and moats. The Period II investment in additional layers of defense such as the construction of fortresses and wall-systems would have been justified by an increase in the frequency and scale of warfare.

The districts of the northern half of the survey zone were very likely collaborating in defense by building a system of fortresses detached from the residential areas. In contrast, in the rest of the survey zone, the supra-local communities were acting autonomously, building fortresses for each population cluster to serve as refuges against attacks. In the southern section, only SLC 212 pursued a different strategy, in which defense investment was minimal. In SLC 212 public labor was devoted to creating a ceremonial center with huge plaza spaces, allowing for ceremonies involving thousands of people. This architecture suggests pursuit of alliance building through ritual. Analysis suggests confrontation occurred between these autonomous clusters in the south, but also between the two largest districts of the southeast (SLC 204 and 207) and the northern coalition (SLC 201, 202, 205 and probably 203 and 206). The boundary between the two largest competing districts, SLC 201 and SLC 204 was underpopulated and protected by two defensive lines of fortresses.

During Period II, a wall system was built at the northwest limit of the survey zone, blocking or limiting the accessibility from the Solivín area. This may be an indicator of an external threat, coming from either the lower portion of the Valley, where a complex political organization centered in Caylán dominated, or from the northern valleys of Lacramarca or Santa. In fact, using data from Daggett (1984) survey and more recent research (Chicoine 2010a; Cotrina, et al. 2003; Ikehara and Chicoine 2011; Shibata 2014), we can identify a territory of between 6 to 13 kilometers with very low population density that may have correspond to a buffer zone (Figure 9-10) between the Middle and Lower Valley. In this zone, only a few small sites have been reported, in contrast to the relatively large sites found in the western half of the Lower Valley, and the densely populated area of the Middle Valley (Chapter 5.0). This gap is small in comparison with conflict-driven buffer zones identified in other regions, such as the American Southwest (Wilcox and Haas 1994) or the Peruvian Altiplano (Arkush 2011), but it is scaled to the dimensions of the Peruvian coastal valleys, and it is similar or even larger than the gaps identified in the Moche Valley for the same period (Billman 1999). Thus, a plausible source of threat for the Middle Valley residents may have been the communities of the Lower Nepeña Valley. The combination of both, external threat and local raids could have been a significant factor in the formation of the suggested coalition in the north half of the survey zone.

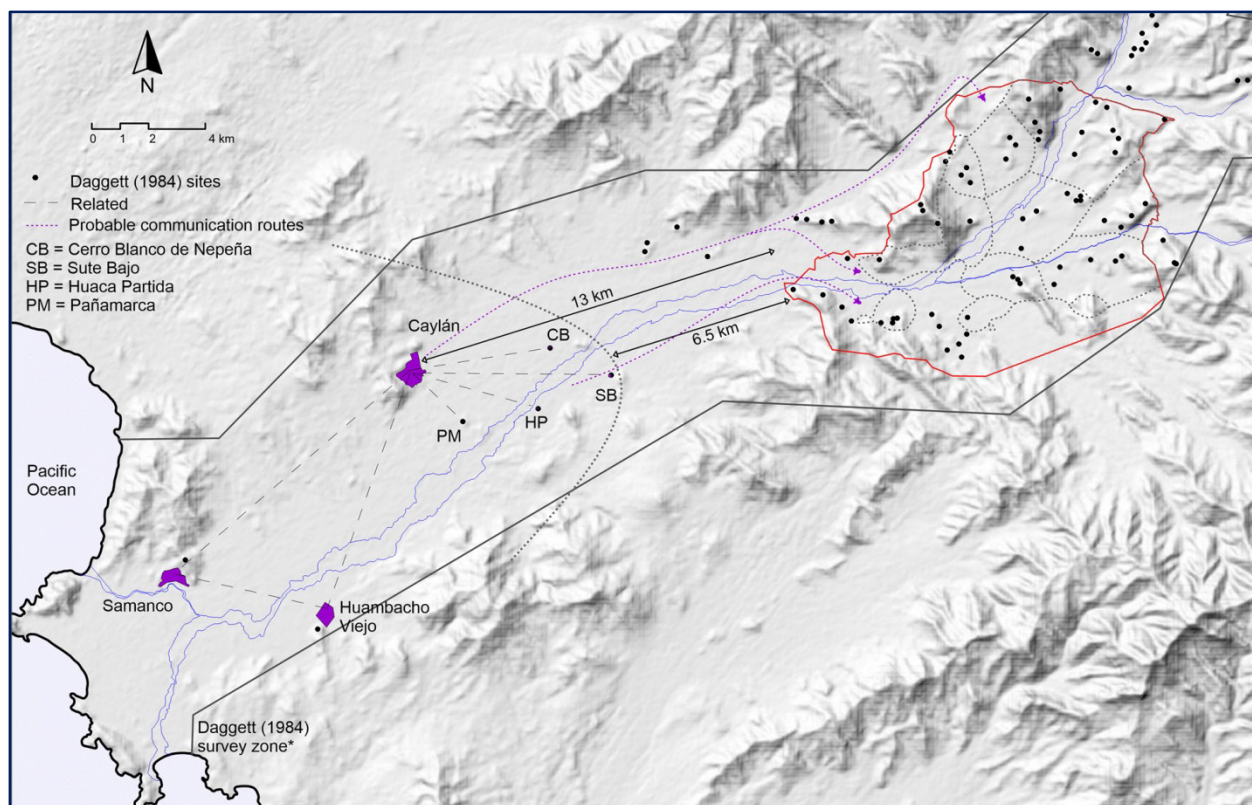


Figure 9-10 Nepeña Valley sites and proposed buffer zone (Daggett 1984, Ikehara and Chicoine 2011). Lower Valley sites are shown at actual size.

Although there is solid evidence for the escalation of conflict (or at least the threat of it) and iconographic evidence on status display during battles, there is no support for the hypothesis that warfare was a critical leadership strategy, or the basis for the emergence of an elite warrior stratum, during the Final Formative (Period II). War leadership may have been restricted to battles without any transfer of authority to other social contexts during peaceful times. Analysis showed no association between higher ranked household loci and defensive locations, indicating that access to fortresses and refuges was unrestricted for most households.

During the Early Intermediate Period (Period III), population declined and was concentrated in the eastern part of the survey zone. Two districts, economically and ritually complementary to one another, dominated the smaller districts and the dispersed hamlets and households. The aggregation of most of the population inside fortified villages and the reuse of some of the Late Formative (Period I) fortresses indicates that the demographic reduction did not alleviate the threat of attacks. That defensive concerns did not decline with the population drop implies that competition for land given the huge Period II population was not a cause of conflict in Period II.

In Period III, attacks may have become more frequent, at larger scales and/or more unpredictable, considering the decision to live inside the fortifications and relatively far from the agricultural lands. During this period, higher ranked households enjoyed privileged protection, living either inside or closer to the fortified towns, in comparison to lower ranked ones. Iconographic evidence from the adjacent highlands and coastal valleys has also suggested that military leadership was institutionalized in the region during this time period. Although the survey area saw a drastic population drop, conflict may have been organized around more complex, and spatially larger, political units. At this time, leaderships incorporating warrior prestige assumed a larger role in these more complex and hierarchical societies.

It is possible that the earlier Moche colonies in the Lower Santa Valley were already influencing the political relationships in Coastal Ancash, although the full imposition of Moche hegemony did not occur until A.D. 500, (Chapdelaine, et al. 2009). A more plausible alternative could be the pressure from communities of the Gallinazo tradition, which developed a complex chiefdom or state level society in the Virú Valley before the expansion of Moche to that valley (Millaire and Eastaugh 2011). Gallinazo related communities may have carried out the construction of the Tres Marías mound complex¹⁴, located next to the later Moche regional political center of Pañamarca.

In sum, the patterns of conflict evidenced in the survey zone suggest that the importance of warfare in life and leadership changed dramatically through time. After a relative peaceful Late Formative (Period I), the Final Formative (Period II) saw the increased population fragmented into competing supra-local polities, and tension and conflict inside and between valleys. In the districts of the southern section of the survey zone, the residents acted autonomously and atomized the effort of building fortresses to protect individual population concentrations. To the north, the supra-local policies pursued defensive alliances, perhaps in response to the threat of attack from outside the survey zone. The social context of violence in the area did not measurably boost the development of Period II leadership. Although war leadership may have been important to higher ranking individuals, it may have provided only a temporary or limited basis for authority. Only later, during the Early Intermediate (Period III), when population reorganized and concentrated, is there evidence for a relationship between leadership households and defensive features.

¹⁴ Gallinazo features include adobes with cane-marks and Incised Castillo pottery. David Chicoine, e-mail message to author, November 11, 2014

10.0 DISCUSSION: TRAJECTORIES OF SOCIAL CHANGE IN THE MIDDLE NEPEÑA VALLEY

In this section, I reconstruct the trajectories of social change from the Late Formative through the Early Intermediate Periods in the Middle Nepeña Valley. I summarize my main interpretations based on the analyses making up the previous chapters. Lastly, I address the initial research questions presented in Chapter 1.0 concerning demographic patterns, socioeconomic integration, inequality and leadership, ritual practices and ceremonialism, the nature of conflict, and the local manifestation of the disintegration of the Cupisnique-Chavín Religious Complex.

10.1 PERIOD I: THE CUPISNIQUE-CHAVÍN RELIGIOUS COMPLEX

Between 800 and 450 B.C., during the Late Formative Period, the population in the survey zone was estimated to be between 1244 and 1866 people. Most of them were organized in two districts, one large (SLC 101) in the east and one smaller (SLC 102) in the west, while some others farmsteads were dispersed outside the districts. During this time, people were living forming small clusters of households in the survey zone. The largest cluster, Cerro San Isidro, aggregated almost one third of SLC 101 population, while other clusters were settled close to the edges of the district. Several lines of evidence suggest that these households were economically and ritually integrated during this time.

In general, potters were living close or next to the households' clusters, which concentrate potential consumers. The uneven distribution of pottery production among and inside districts indicates that pottery exchange may have been playing an important role in supra-local community integration. In SLC 101, pottery was manufactured by a small number of families engaged in relatively high intensities. This could have enhanced the economic integration of the households inside the district, but the total production would have been insufficient to fulfill the needs of the whole district and the supply from other potters' households in the survey zone would have been required. In fact, SLC 102, despite its

smaller size and with families engaged in this activity in relatively low intensities, have a total output similar to the larger SLC 101.

The largest, and so far the only identified, ceremonial center in the survey zone, Nuevo Moro 4, was built inside SLC 101, but detached from any population aggregation. This center was composed by several mounds distributed in a U shape layout, in similar way to those Middle and Late Formative U-temples from the Central Coast (Burger 1992, 2009; Williams 1978). It has been suggested that these formative central places were the locales of face-to-face social integration for the community (Dillehay 2004; Ikehara and Shibata 2008). In fact, both, the construction process of its buildings and the audience for its ritual practices, would have included people from outside the boundaries of the district and even from outside the survey zone.

Some of the Late Formative pottery types of the survey zone resemble those found in Cerro Blanco de Nepeña and Huaca Partida (Shibata 2011), contemporaneous ceremonial centers of the Lower Valley, as well to those recorded in other Late Formative centers such as Chavín de Huántar (Mesia 2007). Consequently, these Middle Nepeña Valley communities were not only coexisting with the Cupisnique-Chavín Religious Complex, but the evidence indicates that they were also participating in the long distance exchange network of prestige goods, and very likely they were performing similar ritual practices under similar beliefs.

During this period, stable leadership emerged inside the network of relationships that form clusters of households in the survey zone. Kinship relations would have provide them with an ideological basis for initial faction building (Brumfiel 1994), gathering of resources, and/or management of labor to accomplish large scale projects, such as the ceremonial center. For this reason, long-term leadership could have been possible mostly in areas of agglomeration of population such as villages or towns. Higher ranked households residing in isolated locations seems to have had shorter existences.

The current evidence does not support hypothesis of authority building on the control over staple economy -such as ceramic production and the property of the best agricultural lands-, or their performance as permanent military leaders. However, there some indicators that leaders had preference in access to exotics as it is expected in the Cupisnique-Chavín Religious Complex model (Chapter 2.0). The fact that exotic pottery was not highly concentrated in the ceremonial center, but it was also found in the residential areas, suggests that it was also used in more local and focalized ritual practices, and it is indicative of the importance of its redistribution or exchange, activity that could have been in the domain of leaders. In consequence, during this period, leadership could have been forged in the intersection of

community integrative practices and the participation in the pan-regional network of elite solidarity created by the Cupisnique-Chavín Religious Complex (Figure 10-1).

The moderate dispersion of the population may have shaped a setting in which the mobilization of people to participate in communal projects or ceremonial aggregation led to relative higher costs for all the households despite their social rank. Leaders may have needed to highlight the benefits of cooperation and participation in order to keep the community together and maintain the structure or power relations (Beck 2003; Stanish 2004). For this reason, much of the resources and labor would have been used in the construction of public spaces, such as the U-temple, and other projects with shared benefits, such as artificial irrigation systems. The model assumed that cooperation was voluntary, and based in the acknowledge of shared benefits, then the threat of losing followers, especially in the face of competition of other political centers, may have been a constant threat and a limiting factor for the creation or display of dramatic inequalities (i.e. palaces) or the use of coercion.

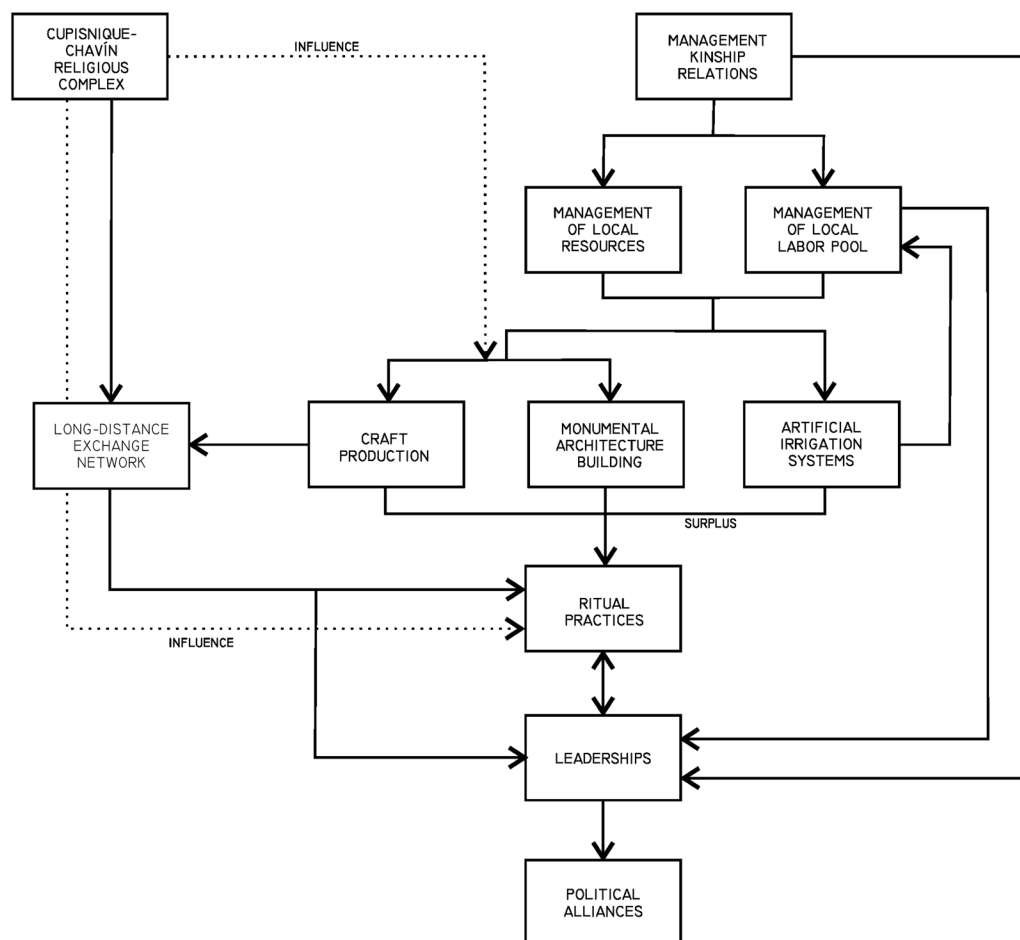


Figure 10-1 Reconstruction of the construction of leaderships during the Late Formative Period (Period I).

Between 800 and 450 B.C. the Cupisnique-Chavín Religious Complex disintegrated in two waves. The first had more impact in coastal communities, while in the second, the whole system finally collapsed. This event caused dramatic disruptions in ritual and economic practices, such as the abandonment of ceremonial centers, rejection of the set of images and symbols –and hence ideas- related to the Cupisnique-Chavín Religious Complex, and the disintegration of the long distance network of prestige goods exchange. In this situation, leaders lost part of their ideological foundations, the control over an exclusive resource (exotics), and hence their capability to direct and perform the ritual practices reduced, and, in consequence, they must have been exposed to critical evaluation and discredit by contenders and followers.

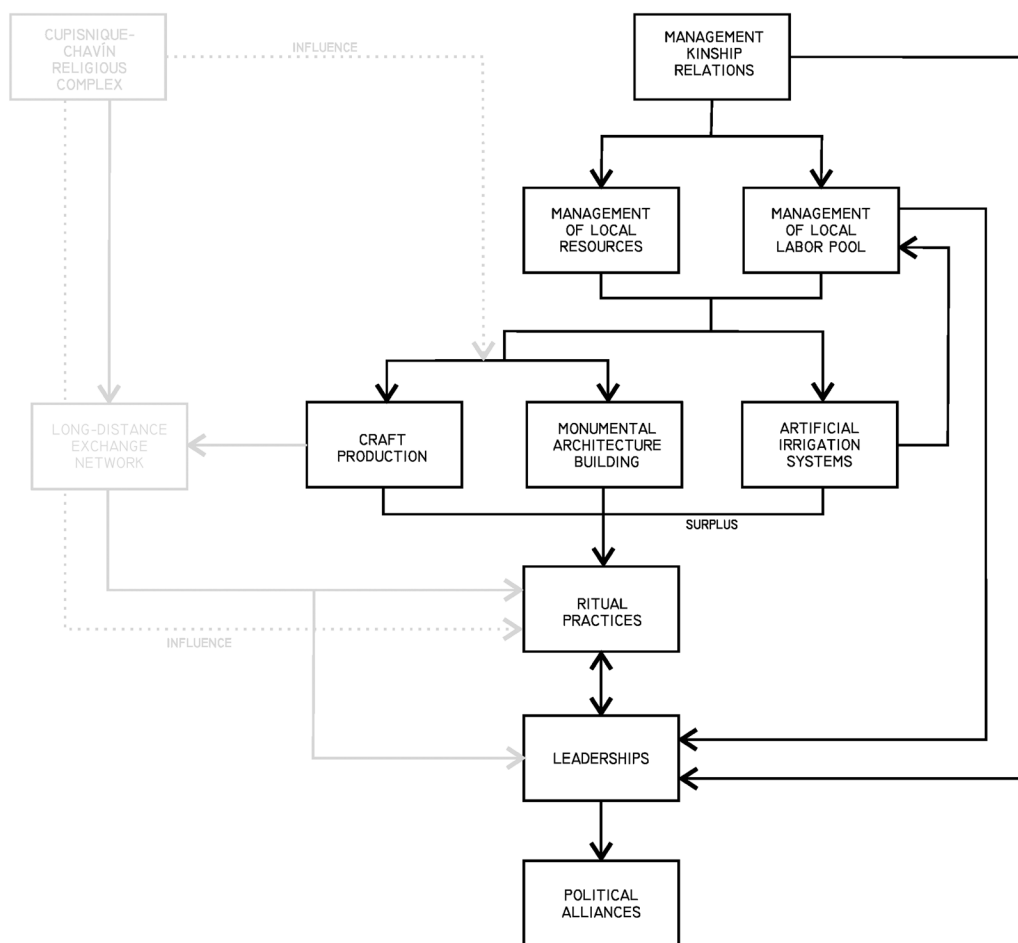


Figure 10-2 Disruptions (gray) in the political system in the survey zone by the end of the Late Formative (Period I).

The degree of the political crisis must have been proportional to the dependence of local leaders in the collapsing ideological system (Kolata 2006). In some areas, such as the Lower Nepeña Valley, new forms of leadership were already present by the end of the Late Formative (i.e. Caylán and Huambacho

Viejo), and consequently the crisis must have been felt in lesser degrees. In fact, it seems that the novel situation benefited them, facilitating the spread of its influence to other groups. The reconstruction of the political system in the Middle Nepeña Valley indicates that leaders had a high reliance on the participation of this pan-regional ideological system, and that they found in the trafficking of exotics and probably the organization of Cupisnique-Chavín ritual practices (Ikehara 2010), power resources that can be controllable because they were not widely available and/or accessible. Without them, authority would be based almost exclusively from the management of kinship relations, and the political practices derived from the management of local resources (Figure 10-2).

10.2 PERIOD II: POLITICAL CRISIS AND SOCIAL FLUX: THE EMERGENCE OF NEW LEADERSHIP

The following period, the Final Formative, was the moment in which these communities reorganized under new modes of socioeconomic and political organization, as the result of the disintegration of the Cupisnique-Chavín Religious Complex.

In their first attempt to confront the suggested moment of political crisis, leaders recurred to known political practices: massive aggregation and emphasis in highly visible communal projects. Several ceremonial centers, some of them with megalithic architecture, and capacity to host audiences larger than their surrounding population were planned and their construction started. However, only few were completed and used during the rest of the period (i.e. El Molino and Kushipampa), while others were not complete enough to being usable (i.e. Virahuanca Bajo South), or were completed in expedite way, changing the original design (i.e. Quisque).

I suggest that these buildings and the political practices behind their design failed because the social conditions surrounding them have changed. It is plausible that those political practices used to put together hundreds of families living in relatively small household clusters dispersed through the survey zone, could not necessarily work for thousands of families living in a very fragmented political landscape dominated by dense settlements of hundreds of people. Part of the ideological foundations of Late Formative projects such as Cerro Blanco de Nepeña, and Nuevo Moro 4 -the U ceremonial center of Period I-, must have come from the Cupisnique-Chavín Religious Complex. In addition, the several projected ceremonial centers could have failed because leaders were not able to congregate labor pools of enough size. This occurred not because population were not enough, but because the benefits of

finishing such projects were not worth of such effort for both leaders and followers. Instead, emphasis started to be given to multiple projects that could be built mainly with local labor pools of the districts. The construction and use of these centers would have boosted local group integration and emphasized local identities.

In his conditional cooperator model, Stanish (2004), suggests that people would give up to authority because there are higher benefits on cooperation, and leaders' strategies consist in constantly emphasize the benefits of the system. However, if the situation changes into a scenario in which people cannot simply leave because costs became too high, cooperation with leaders is not anymore voluntary, but it would be the only option (Gilman 2001). In that case, in order to maintain authority positions, leaders do not need to emphasize the benefits of cooperation anymore, but to try to keep the cost of uncooperative behavior very high. This last scenario could occur by the perpetuation of internecine warfare in a patched landscape where movement is increasingly restricted (social circumscription), or in a setting where critical resources –such as water- are monopolized and people have to cooperate. In these situations, rulers could be able to use resources and energy with less opposition from the community. I suggest that these scenario describe the situation of the Middle Nepeña Valley during the Final Formative Period, and shaped the way political crisis derived from the disintegration of the Cupinisque-Chavin Religious Complex was confronted.

The post-crisis time was shaped by the dramatic augmentation of population. During the Final Formative the average population in the survey zone was estimated to be between 8475 and 12713 people, which represents a seven fold growth from the previous period. This demographic growth was a regional trend, and it has been reported or can be interpreted for the Casma, Santa and Virú valleys (Willey 1953; Wilson 1988, 1995). However the growth rate in these valleys was uneven (Table 10-1). Casma and Middle Nepeña demographic growth during the Final Formative was much higher than in the Santa Valley. Being other things equal, this variance may be the result of inter-valley migration.

Table 10-1 Population estimates for four contiguous valleys.

Period	Casma*	Middle Nepeña	Lower Santa	Viru
Late Formative	7942	1555	5960	-
Final Formative	54400	10595	7855	14286
Early Intermediate	56470	1527	20110	29658

Note: * Wilson only provides estimates for the Final Formative (Patazca Period). I obtain the density of people per occupied hectare, and then I use the relative ratios of variation between similar periods given for the Santa Valley (Wilson 1988) to assign occupational densities for the Pallka (Late Formative) and Cachipampa (Early Intermediate Period)

The small peripheral household clusters of the previous period evolved to become the centers of districts of hundreds or even thousands of people. The widening of social networks by the inclusion of newcomers could be a factor in such growth. Using distance and population densities twelve demographic territories –districts- were defined. However, only ten of them can be clearly defined such as supra-local organizations. SLC 209 may be only a small town located at the periphery of SLC 207, and SLC 210 was a group of villages and small towns very close each other without clear signs of centralized authority.

The demographic fragmentation of the region was not accompanied by the replication of redundant or equivalent political units. The districts display a varied of ways in which population was concentrated, pottery production was organized, defense effort was carried out, labor was used, and ritual was practiced. All of these suggest that a multiplicity of political forms and leadership flourished during this epoch.

Despite that the populations in the districts were more concentrated in average, the variance between them also increased. In the one hand, districts such as SLC 205, concentrated almost all its population in its central place of Cerro San Isidro. In the other hand, some districts were characterized by only moderate concentration of population. Moreover, districts such as SLC 203, 208, 211 and 212, followed a pattern in which most of the households were settled in two major demographic clusters, one larger than the other. In some of these districts, leaders were mainly settled in the second larger cluster and not in the demographic center.

In the process of the formation and consolidation of household clusters and villages, the factor of the attraction of leaders and affluent households cannot be discarded. However, the transition between the Late Formative and the Final Formative indicates that these dense settlement were the developments of previous hamlets by natural population growth and the integration of newcomers. Moreover, the evidence suggests that these densely populated environments were the matrices in which leadership emerged. While many households clusters appeared during the Final Formative in areas where leaders were not present before, most of the long-term leaders were located inside or very close to large villages and towns. Indeed, during Early Intermediate Period, the few consolidated leaders were detected only in the two largest and densest settlements.

While population increased dramatically during this period, the increase of higher ranked households occurred in a lower rate. This indicates that leaders, not only were higher in numbers, but they had at their disposal larger factions. In contrast, those leaders living in low density zones, were not

surviving for many generations, and probably they were moving in some moment to denser areas, where better protection and larger political support can be obtained.

Despite this fragmented landscape, some households and districts were continuing cooperating in economic activities. With the exception of the gardens plots located in the riverine zone, where moisture is available near the surface, cultivation in the desert coast requires the construction and management of artificial irrigation. The geographic and topographic characteristics of the Moro Pocket indicates that the east section of the survey zone is crucial for any attempt of control of the water intakes and the main canals. Districts such as SLC 201, 204 and 207, could have benefit from their strategic location.

The manufacturing of pottery was unevenly distributed in the survey zone, and the scale of production was not proportional to districts' population. Some districts, such as the large SLC 201, was exposed to production deficits that must have been coped with the surplus of other districts and dispersed non-affiliated households. This suggest that pottery exchange was part of an economic network that did not follow demographic or political boundaries. Pottery production could have been a bottom-up initiative, carried out in low intensities inside the districts, and in higher intensities by autonomous households outside the districts.

Inside some districts, such as SLC 201 and 204, some few households engaged in pottery production in relatively higher intensities. I suggest that this can be interpreted as the existence of more specialized households in these districts taking advantage of the high demand of pottery cause by the increased population and uneven spatial distribution of its production. However, there is not enough evidence to suggest any kind of relationship between pottery production and the construction of authority, or the consolidation of power relationships. In similar way to the Late Formative scenario, pottery production was carried out close to population clusters, reducing the cost of transportation from the production loci to the consumer, but also facilitating the provision to leaders residing in such locations.

It is more plausible that the control over production and distribution of goods was not as important as the control over some important context of their use, in the ceremonies and rituals, as it has been suggested for the Late Formative communities. Despite the failure of the construction of new public infrastructure at the beginning of the period, ceremonial centers were still important for ritual performances. A new set of ceremonial centers were built exhibiting a wide variability, not only indicative of different architectural preferences but also the practice of rituals of different characteristics. Some of the ceremonial centers were large monumental compounds mainly devoted to ceremonial activities (i.e.

Kushipampa in SLC 201 or Virahuanca Bajo North in SLC 212), in others, ceremonial spaces were built in fortresses or embedded in towns. In one case, in SLC 210, the ceremonial compound seems to have been an elite residential compound, and suggesting powerful local leadership monopolizing community rituals.

Inside the ceremonial centers, the plazas delimited the setting in which ritual practices were performed while, at the same time, define the social boundaries of the participants. Despite the variability of plazas sizes, most of them were scaled according to the districts' population. In contrast, with old-fashioned ceremonies, most of the ceremonial buildings were designed to use only districts' labor pools, and the public spaces –plazas- were designed to host audiences mainly from inside the districts. This suggests that during the Final Formative most of the leaders were not trying to integrate households at regional scale anymore, but to consolidate their own districts. Supra-local communities were building their own ceremonial centers for themselves. Only two exceptions were found. The first, the ceremonial center of SLC 202, El Molino, must have required the collaboration of households from neighboring districts. The other is SLC 212, which must have been the only district which leaders were trying to create alliances with surrounding communities by the use of old-fashioned political practice.

The construction of Virahuanca Bajo North, the ceremonial center of SLC 212, as well as the other ceremonial centers at the west (Virahuanca Alto, Quisque Bajo in SLC 211 and Complejo Quisque) would have required the collaboration of households from other districts and outside them, and it is possible that the leaders of SLC 212 were playing a pivotal role in this interaction. The ceremonial center of Virahuanca Bajo North, includes public spaces capable to gather audiences of multiple districts, indicating its leaders were the only ones persevering in the use of large scale aggregation as a tool to enhance solidarity between communities. Even more suggestive is that this was occurring in a zone that can be characterized as occupied by multiple small and autonomous clustered of households, similar to the Late Formative sociopolitical landscape in the survey zone.

During the Final Formative, the preference of inhabiting in the hills and mountains increased, placing people farther away from their garden plots, but improving the defensibility of their settlements. In contrast to the previous period, the Final Formative have solid evidence of the escalation of conflict (Arkush and Tung 2013), but the warfare landscape must to be analyzed as a palimpsest of several layers of violence exchange.

Two defensive patterns has been observed in the survey zone. The first involve the location of the fortresses far from the populated areas in the northern half of the survey zone. The effectiveness of this defensive system depends on the early detection of attacks, which must involve coordinated effort of neighboring communities. The similarity in ceremonial architecture indicates that SLC 201, 202 and 205

may have share similar political practices, and moreover, as mentioned above, there are signs of multidistrict cooperation in the construction of El Molino, the ceremonial center of SLC 202. While these districts shows clear signs of political activity (leaders), the contiguous districts of SLC 203 and 206 lack of them, suggesting a certain degree of political dependency.

I suggest that these districts must have been cooperating and potentially formed an alliance during some moment of the Final Formative. This alliance could have been centered in SLC 201, with Kushipampa, as head considering its large population and the enormous effort to protect this settlement with a ring of fortresses. This defense system would have protected SLC 201 population, but also serve as refuges for households from SLC 202 and 205, while the defenses in the SLC 203 and SLC 206, would serve to defend the natural passes. It is plausible that one factor in the formation of this alliance was the threat of attacks from communities of the Lower Valley where the large political system of Caylán was located (Chicoine and Ikehara 2014), or from Lacramarca-Santa where a dense system of fortification has been also found (Wilson 1988).

In the rest of the survey zone, the defense effort was more atomized. This second pattern involve the settling of people next or surrounding the fortresses. This permitted a quick access to them in case of attack, but also suggest that advance warning was not allowed. This low predictability may result from the lack of coordinated effort between communities, because either they tried to stay autonomous, or because their relationship was shaped by internecine strife. In consequence, at the south of the Loco River and in west half of the survey zone, each cluster of population had their own fort, with the exception of SLC 212. This last community, instead to have invested in defenses, they practiced large integrative rituals. I speculate that these rituals must have been carried out in order to boost cooperation outside their own boundaries and form alliances, which are crucial for survival in this violent time.

In this new social environment, districts evolved as well the variety of leadership in the region (Figure 10-3). As mentioned before, the evidence suggests that the practice of large aggregation in rituals was mostly abandoned in favor to more local ceremonies. In some districts (SLC 203, 206, 208 and 209), higher ranked households –my proxy for leaders- was not very obvious, and it may indicate of dependence or collaboration with larger districts in sub-regional alliances.

The presence of new and multiple ceremonial centers with different characteristics is an indicator of the diversification of ritual practices. While the U-temple of the Late Formative and the incomplete projects of the beginning of the Final Formative emphasized openness and horizontality, those finally completed and used during most part of the Final Formative had a wide variability in vertical/horizontal tendencies, but most of them with an increased restriction to rituals. In addition, in contrast to the

previous period, the ceremonial complexes of the Final Formative were close to populated areas, and, in some communities, such as SLC 201, higher ranked households were slightly or moderately closer than the rest of the community. This suggests that Final Formative ceremonial buildings -and the ritual practices performed on them- were conceived not only to reinforce the political affiliation of the population of the district, but also to serve, in some cases, as a marker of the social differences that were emerging inside some districts.

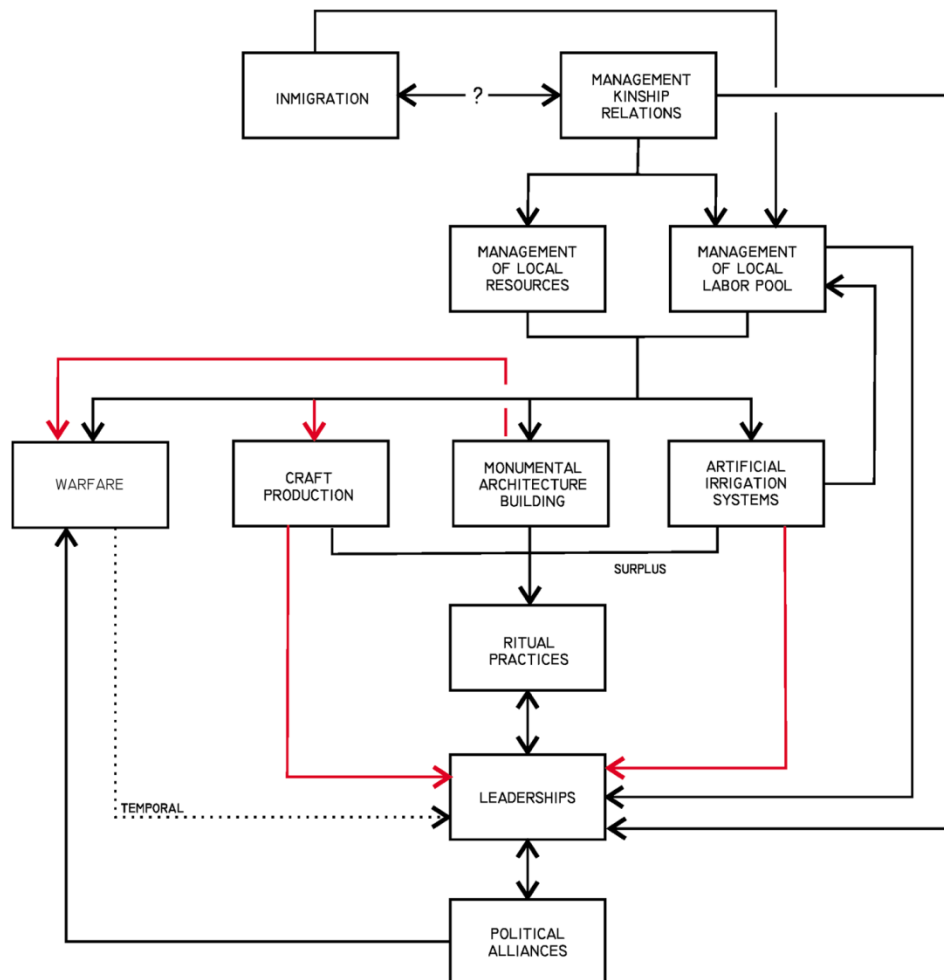


Figure 10-3 Reconstruction of the construction of leadership during the Final Formative Period (Period II). Some relationships varied among districts (red) while others were temporary (dashed line).

Finally, the evidence for the emergence of war leadership is ambiguous. On the one hand, iconographic evidence suggests that during the Final Formative, a warrior ethos emerged inside the communities of the region. On the other, neither higher ranked households were the only users of

polished-stone-point daggers, nor did they tend to live closer than the rest of the community to the defensive structures. War leadership may have existed during this epoch, but it may have been restricted to the battlefield or during defense efforts. No evidence supports the hypothesis of the emergence of coercive power relations despite the escalation of conflict. Warfare and defense infrastructure may have been considered a communal effort and not the product of some individuals' ambition.

10.3 PERIOD III: POLITICAL CONSOLIDATION AND THE RISE OF REGIONAL POLITIES

During the first half of the Early Intermediate Period (EIP), population collapsed to the levels of the Late Formative Period. Between 1222 and 1832 people remained in the survey zone. This dramatic decrease could have resulted from the high levels of violence of the previous period, but it is more likely reflecting demographic trends in the whole region. While the Casma valley seems to keep the population to Final Formative levels, in the Santa and Virú valleys, population increased sharply. In the Virú valley, a regional polity was consolidated and its political center, the Gallinazo Group, concentrated between 10 000 and 14 400 people (Millaire and Eastaugh 2011). It is possible that many families in the region moved to the Virú Valley explaining the depopulation of the Middle Nepeña and the demographic explosion in Virú.

Despite the dramatic reduction of population and the increased availability of good lands in the west, population concentrated in the eastern section of the survey zone. During this period all the districts concentrated their population in similar degrees, sign that they were following similar residential patterns. The vast majority of the households were organized in two districts, SLC 302 and 305, and several lines of evidence indicate that the other districts must have been dependent of them. Despite that households in these two districts did not have access to the best soils, they did have a privileged position to control the water canals and intakes of the artificial irrigation system of the region.

In contrast to the Final Formative Period, two districts, SLC 302 and 305, agglutinated 64% of the population and the 86% of the higher ranked households of the survey zone, and were dominant also in other social domains. The pottery manufacture concentrated in them (73% of the total), having SLC 305 more than the half (53%) of the survey zone total production for the period. These production was highly concentrated, and carried out by several households in low intensities with the exception of some households close to the demographic center of SLC 305. The other three districts had a very small or not share at all of the total pottery production. In contrast, the dispersed households at the west, outside the

boundaries of the districts, manufactured in relatively higher intensities around 27% of the pottery. This suggests as the previous periods, an intense exchange of goods inside and outside the districts, but, in this case, highly centered in the two dominant districts.

During this epoch, a new long-distance exchange network emerged involving highland and coastal communities of Ancash. The highland communities have been usually associated with the Recuay Culture (Lau 2011), while the coastal ones have been related to the Gallinazo phenomenon (Millaire and Morlion 2009). The distinctive ceramic style of the Recuay style have been found in numerous settlements of the coast (Lau 2011; Proulx 1982; Wilson 1988) and they are the most solid evidence of the reconstitution of trade networks in the region. The two major districts, SLC 302 and 305, had most (around 71%) of the exotics brought to the valley, being SLC 302, the dominant community. The highly centralization of these objects speaks of the restricted distribution and access of such objects.

The two main settlements of this epoch were fortified villages. In SLC 302, the defensibility of the ceremonial center of Huancarpón and its attached village was improved by the construction of perimeter and dividing walls, and moats. Huancarpón monumental architecture had a horizontal character that indicates the relatively higher importance of plazas in the ceremonies. While most of the remodeling could have been carried out by the households of the district, the audience of the plazas may have included households from other districts, and speaks of the resurgence of an old-tradition of large scale ritual aggregation. In contrast, SLC 305 was a fortified village built around Final Formative fortresses. Its monumental architecture had a vertical emphasis, indicating the relatively higher importance of the vertical construction such as mounds and platforms. The plazas and the associated platforms must have employed only local labor and they were built to be capable to gather only a small portion of the population during rituals, either the local surrounding households, or the higher ranked families and/or individuals. Both ceremonial complexes were spatially correlated with the demographic centers of each district.

In this new socioeconomic context, the variety of leadership that proliferated during the previous period disappeared. Leaders' households were settled mostly in the two largest districts and highly concentrated in the demographic centers. Leadership during this early part of the EIP became more homogeneous and based in their dominant role in the exchange of exotics, ritual, and probably warfare. In the districts with large share of pottery production, SLC 302 and 305, this activity was mainly found in or near the demographic centers, where most of the leaders lived. However, this activity was not exclusive of higher ranked households; lower ranked households did engaged in this activity but only in lesser intensities. Consequently, there is no evidence to suggest leader's control over this activity during

this period, but it does suggest the economic dependence of other households and districts to these two dominant districts.

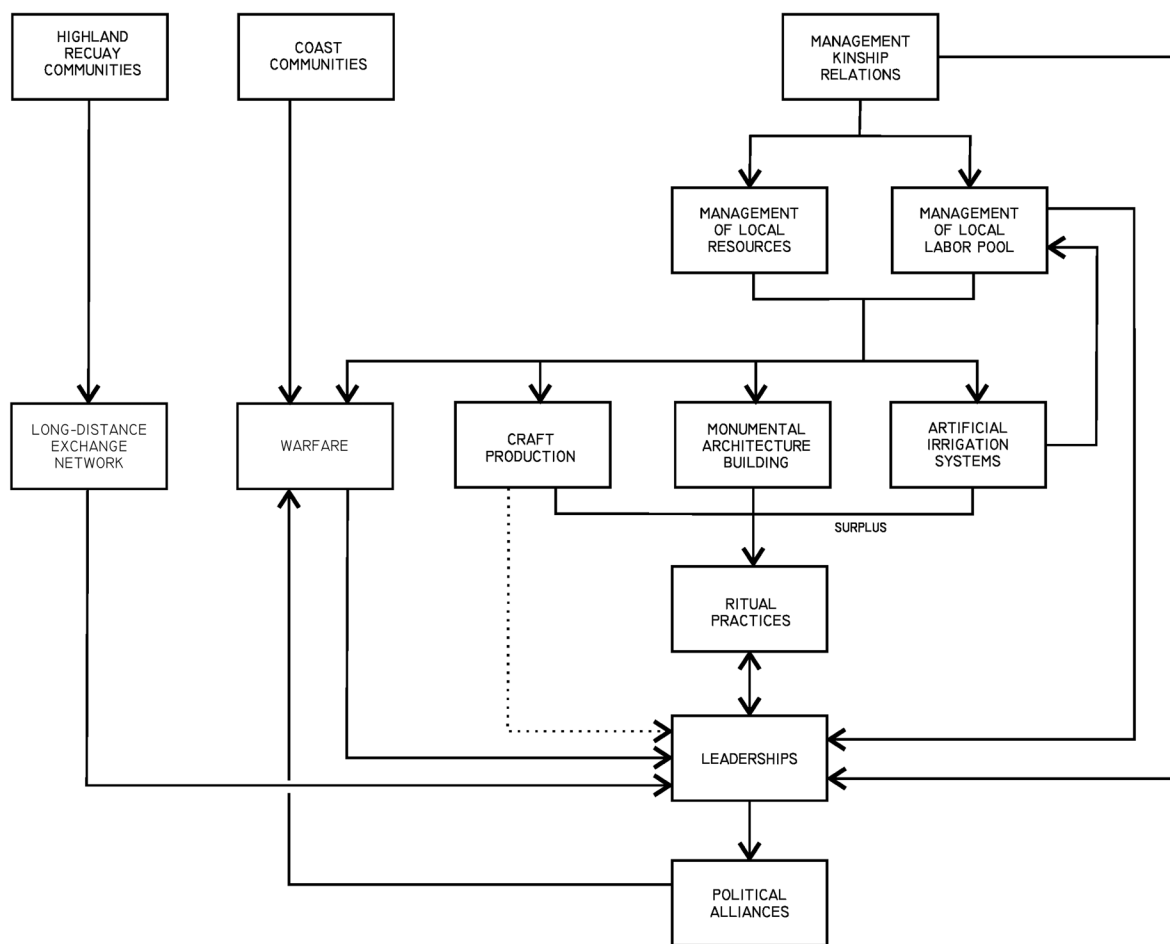


Figure 10-4 Reconstruction of construction of leaderships during the first half of the Early Intermediate Period (Period III). Some relationships reflect dominance (dashed line).

While Early Intermediate Period constructions and remodeling were carried out mainly by local groups, ritual practices show different characteristics in SLC 302 and 305. Plaza setting and large scale aggregations were very important in Huancarpón, and social inequality was manifested by the relatively proximity of affluent families to this ceremonial center. In contrast, at Chachuas Cucho 1, the ceremonies were mostly for local population, and there were no meaningful difference of proximity between higher and lower ranked households. Inequality was more visible in the dramatic difference of access to defensive structures. Higher ranked households had a clear advantage over lower ranked households by living closer or inside the towns' defenses. This indicates a dramatic and important difference from the previous period.

In summary, during the Early Intermediate Period, the change in settlement patterns reflected the marked decline in population, and reorganization in how supra-local communities were organized and power relationships structured. There were two main supra-local communities. One was dominant in exotic exchange and consumption, and integrated at the supra-local level through large scale ceremonial aggregations at a central monumental center. The other district was dominant demographically and in pottery production. The economic, social and political characteristics of the other districts and households followed from the influence of these major players. Leadership was built on management or dominance of long-distance exchange networks, ritual, labor, and defense. Some of these leaderships were innovations of the Final Formative (Period II), but during the Early Intermediate Period they were combined into stable power configurations that were replicated at different scales in the region. The complex Period III sociopolitical systems, may well have been shaped by interaction with highland populations, as well as the threat and/or influence of states (Gallinazo or Moche) that were expanding in the neighboring territories. Finally, around AD 500, the Middle Valley was integrated into a valley-wide political system centered on the Moche urban center of Pañamarca, in the Lower Valley.

11.0 CONCLUSIONS

In this chapter I draw conclusions from the reconstruction of the sociopolitical trajectory of the Middle Nepeña Valley described in Chapter 10.0 . I highlight the main findings and suggest the major contributions of my research to the archaeology of the North Coast of Peru, and to our understanding of how people respond to social crisis.

11.1 THE END OF THE FORMATIVE IN THE PERUVIAN NORTH COAST

The end of the Formative Period has been traditionally been examined from the perspective of articulation with the Cupisnique-Chavín Religious Complex, or to look for the antecedents of the later Moche or Recuay configurations. While needed, such perspectives overlook the complexity and variability of local dynamics during this time (Ikehara and Chicoine 2011). The present research investigated the Final Formative Period as a time of the emergence of social features that, a few generations later, became part of the foundation for authority and power relations of post-Formative complex societies of the North Coast of Peru.

One of the major findings of my work is that there was marked social flux between the Late Formative and the Early Intermediate Periods involving dramatic population shifts, the abandonment, replacement, and diversification of huge monumental centers, the florescence of diverse leadership strategies in a context of political fragmentation, the rising influence of conflict on settlement and political leadership, and the development of economically related leaderships, part of the evolution of power relations and leadership.

11.1.1 Demographic Transitions

Unlike some other cases of socio-political disintegration, such as the Classic Maya collapse (Culbert 1988), the end of the Late Formative Period regional integration was followed by a substantial increase of population. This Period II demographic surge seems to be explained, at least in part, by immigration from other valleys, such as the Santa. However, this does not mean that the invasion hypothesis, proposed by Pozorski and Pozorski (1987), is supported and can explain cultural change. Political transitions have been identified in the Nepeña Valley, i.e. Caylán and Huambacho (Chicoine and Ikehara 2014), before the abandonment of the Late Formative centers of Cerro Blanco and Huaca Partida. Final Formative ceramic domestic assemblages clearly show continuity with earlier assemblages, with no signs of abrupt replacement. Finally, the large demographic aggregations of this period were developments from earlier household clusters. Thus the immigration into the valley, including potentially the movement of people up from the Lower Valley, did not take the form of invasion and cultural replacement. The newcomers were incorporated into already existing social network, increasing the size of the settlement, and changing the conditions in which politics were practiced during this epoch.

This population growth and concentration was an important factor in the emergence of leadership. Long term leadership seems to have emerged mostly in places where population was relatively concentrated. However, this increase of population during the Final Formative (Period II) was not accompanied by a similar rate of increase in the number of higher ranked households, indicating that leaders enjoyed larger groups of followers. This could account, in part, for the large amount of labor used in construction projects in the survey zone during this period.

11.1.2 Abandonment and Replacement of Ceremonial Centers

The disintegration of the Cupisnique-Chavín Religious Complex was manifested in the Nepeña Valley by the abandonment of the ceremonial centers related to it. The U-temple of the Middle Valley was replaced by several new monumental projects which despite, or maybe because of, their scale, were left unfinished or completed in expedient ways.

The discovering of unfinished buildings was unexpected because they were considered as completed ceremonial centers in previous research (Daggett 1984). I have provided evidence supporting the hypothesis that many of these buildings were not completed, and I interpret the whole situation as: a)

the fragmentation of the community manifested in the existence of multiple projects; b) an attempt by communities to build ceremonial centers for supra-local aggregations; a political practice from the Late Formative; and c) the lack of will and/or support to finish them.

Other ceremonial centers that were completed have in common ritual spaces of different sizes, scaled appropriately to gather audiences from inside each district (rather than from the region). I interpret this pattern as a move from the practice of large scale ceremonial aggregation to ritual practices emphasizing local group or district integration. Despite this commonality in demographic scale, Final Formative (Period II) ceremonial centers are characterized more by their diversity than by their similarity. The placing of ritual spaces in multiple different contexts and different formats suggest that communities and leaders were not following the same canon when thinking of the purposes and uses of these public spaces. In addition, the lack of coordinated effort in building many of these spaces is an indicator of the fragmentation of the political life in the region during this period. The increase of population played a critical role in this development, without it, these multiple efforts would not have been feasible or needed.

During the Early Intermediate (Period III), the ritual spaces were organically integrated inside villages and towns, and supra-district ceremonial aggregation returned as an integrative practice. Leaders in this period were, in a sense, performing on extra-district stages. The nature of leadership involved practices or attributes that went beyond the local community or district. The identified demographic “collapse” set new parameters of what communities and leaders could do. In fact, the labor and time invested in these Period III ritual spaces were modest in comparison with previous periods.

11.1.3 Conflict

As previous research has suggested (Chapter 9.0) conflict emerged or intensified during the Final Formative (Period II). However, this research generally has not been focused on identifying the actors in this conflict, or how it shaped the evolution of leadership on the North Coast. My research cannot explain why conflict escalated when it did. It would be too facile to attribute this increase in strife to the disappearance of the overarching Cupisnique-Chavín Religious Tradition, but the timing is self-evident timing (*res ipsa loquitur*). Instead, my research aimed at exploring how conflict shaped the political landscape, and was incorporated into the construction of leadership in the research area.

The major finding in this regard is the identification of at least two levels of vectors of violence. One level is the competition and conflict between districts. This tension must have forced populations to

aggregate, and build their fortresses in close proximities. The second level describes a larger scale conflict, in which several districts had to cooperate and invest heavily in defense. The location of the defensive features suggests an external threat, likely originating from the Lower Nepeña Valley, or the Lacramarca-Santa area.

These results suggest that hypothesis of internal and external conflict need not be mutually exclusive. The identity of the enemy or the origin the threat corresponds to particular historical moments, and is not easily predicted by more general models of ancient warfare.

An important insight in this research is that the intensification of conflict did not correspond with the emergence of structural inequality during the Final Formative (Period II). However, in the following period, when threat came almost exclusively from an external power, leadership did become closely connected to warfare. Two hypothesis emerge from this comparison: a) extreme fragmentation and internecine warfare may have been an obstacle to the consolidation of strong hierarchy and inequality in Period II; and b) warfare itself cannot provide means for the development of power relations (Earle 1997), without other bases for leadership and authority.

11.1.4 Development of Economic Dominance

During the time period under study, two economic strategies for leaders were documented as coming into play; domination of networks of long-distance exchange, and preferential access to, perhaps even control of, irrigation water. In the two periods in which these long-distance networks were active, the Late Formative and the Early Intermediate Period, (Periods I and III) leadership households had proportionally greater access to exotics. A moderate percentage of those other households with exotics were consistently situated close to these leadership houses. This pattern suggests that leaders were taking important roles in the acquisition, distribution, and consumption of exotics in the region during these two periods.

During the Final Formative (Period II), the long-distance exchange network disappeared, at the same time that higher ranked households started to be differentially involved in pottery production, and potentially, began to control agricultural production. The latter was not based on the control of the best lands, but on control over irrigation systems. During the Late Formative (Period I), households were widely distributed, and close to cultivable lands. However, during the Final Formative and the Early Intermediate (Periods II and III), the dominant districts and many of the leadership households were located in areas where control over the main canals of the irrigation systems was possible. I suggest that

these series of changes indicates a stronger emphasis on internal or local power resources following the disappearance of the external (long distance exchange) one. These economic strategies by leadership households continued in the Middle Nepeña Valley during the Early Intermediate Period (Period III), despite the return of long-distance exchange.

11.1.5 Political Variability, Experimentation and Transformation of Leadership

The political transition between Formative society (Periods I and II) and Early Intermediate (Period III) regional polities cannot be solely explained by the failure of the Cupisnique-Chavín Religious Tradition. There was a period of “experimentation” in political forms in which new features such as warfare, the increased population nucleation, and control over irrigation emerged.

The Final Formative (Period II) was the period when multiple and different political forms coexisted. This variability was visible in the way ceremonial centers were designed, inter-district differences in how pottery production took place, the location of leadership households, the size of the districts, and the distribution of the population between and inside districts. For instance, the diversity in ceremonial centers (Chapter 8.0) speaks to inter-district differences in how public ceremonies were performed, controlled, and experienced. The architectural differences meant differences in how leaders and followers interacted in these contexts. The most important Period II ceremonial spaces were located in fortresses, palaces, inside towns, and in separated ceremonial complexes. This political variability ended during the Early Intermediate (Period III), when the region was dominated by two large districts which concentrated much of the Middle Valley population.

Two cases show a sharp contrast in political practice during the Final Formative (Period II). In the northern half of the survey zone, there is evidence for a military coalition or alliance, suggesting a high degree of collaboration among the districts of this area. The head of this alliance was SLC 201, which held the majority of leading families in the zone, and was protected by a system of fortresses. In contrast, in the southern section of the survey zone, most of the local groups were atomistic in defense, with a pattern of a single fortress serving each population nucleation. But one supra-local community in the south, SLC 212, was home to supra-district scale integrative rituals, and I interpret this as an attempt of the leaders of this district to form a ceremonial coalition in the south.

This trajectory describes a transition between a mode of power in which leaders tried to influence others through regulated context or settings, to a structural power in which leaders were

capable of modifying the conditions in which their authority was built and exercised. During the Late Formative (Period I), leaders were able to take advantages of social networks, activated during gatherings in the ceremonial center, but at the same time, they were incapable of, or lacked support to, change the conditions of the “game” (i.e. by modifying the layout of the ceremonial centers). During the Final Formative (Period II), the crisis generated by the disintegration of the Cupisnique-Chavín Religious Tradition, created an “authority vacuum” that permitted experimentation with new modes of authority and leadership. Some of the new social features, may have permitted leaders to manipulate the system and potentially modify the rules of the game, for instance, restricting public ceremonies to a segment of the population, or dominating economic processes. The potential control over irrigation systems, may have allowed these leaders to impose tribute or taxes to dependent households, while the control over long-distance networks may have allowed them to create patron-client relationships (Santley 1993).

As described, external networks were an important part of the construction of power relations in the Middle Nepeña Valley during the centuries. However, it is the combination of this external dimension of authority with an internal one that created conditions for the centralization of authority and power (Sahlins 1963; Spencer 1993), and regional consolidation in the Early Intermediate. Many of these authority and power resources were not consistently present among the districts during the Final Formative (Period II), and only during the Early Intermediate Period, did they converge or coincide in the same political units, generating what can be described as a “recipe” for chiefdom consolidation in the region.

11.1.6 Household Bottom-up Economic Initiatives

While the frequency of exotics relates to political economy, albeit in the domestic economy of high ranking households, the observed distribution of pottery production differed strongly from the expected. The distribution of production did not parallel the distribution of population, indicating an extensive level of productive differentiation at the household level. As noted in Chapter 6.0, pottery production did not correlate with the boundaries of the supra-local communities, indicating that it was carried out independently of political relationships. This suggests that, in contrast to exotics procurement and distribution, local pottery production was a bottom-up economic initiative, rather than not a top-down one.

The discovery of this independent economic system, almost a substrate, provides insights into the coping strategies of households for dealing with system-wide perturbations. It also reveals one way

in which Middle Valley wide social integration was maintained during crisis epochs, and despite the political fragmentation.

11.2 CRISIS, LEADERSHIP AND SOCIAL CHANGE

The primary hypothesis of this research was that periods of crisis, opportunities develop for rapid sociopolitical change, through increased chances that leaders and followers would accept new kinds of leadership and new political actors. The outcome of the crisis can vary from the reproduction of prior political practices, to “revolutionary” leadership, outside the bounds of previous political action. Where on the spectrum between these two poles an outcome might fall is conditioned by:

- a) The degree to which the dominant system is affected by the crisis.
- b) The social and natural environment (initial conditions) during the crisis resolution.
- c) The degree to which communities maintain links (systemic integration).
- d) The action of traditional and new political actors (agency) in such contexts.

The present research contributes to the study of crisis by providing a case to analyze the interplay of these different factors in the response to the crisis. At the beginning of this investigation I expected to study one clear crisis - - the disintegration of the Cupisnique-Chavín Religious Complex. However demographic collapse at the end of the Final Formative (Period II) also fits the criteria to be considered a crisis. These represent contrasting situations (different initial conditions, different degree of systemic integration during crisis resolution) in which leaders and followers were making decisions.

The first, ideological crisis, at the end of the Late Formative (Period I), resulted in a high degree of sociopolitical fragmentation and variance (Final Formative, Period II). Because the previous Period I political system was undercut, new socioeconomic conditions emerged (such as the demographic surge in the survey zone and the escalation of violence), and the crisis resulted in the multiplication of both the number of leadership households and the modes of leadership. The partial maintenance of systemic integration was visible in the system of production and provisioning of pottery, projects with multi-district labor, ritual practices with multi-district audiences, and the replication of architectural canons among some ceremonial centers. This integration limited the degree of variability and divergence that a fragmented social system can produce.

The second crisis, the population drop at the end of the Final Formative (Period II), is a case in which crisis resolution resulted in the relative consolidation of the region (Early Intermediate, Period III) to a level akin to Period I. Demographic collapse, and external threat forced population of the survey zone to reorganize spatially and politically. Pottery production patterns suggest that people were participating in a regional system centered on districts. These dominant districts concentrated craft production, population, exotics, defensive infrastructure, and control over irrigation systems.

11.3 DIRECTIONS OF FUTURE RESEARCH

This dissertation presented a reconstruction of the sociopolitical trajectory of the Middle Nepeña Valley between the Late Formative Period to the Early Intermediate Period, and offered insights on the internal dynamics of the communities when confronting crises.

The research was designed to analyze social processes occurring at regional scale. The methodology of this research permitted me analysis to understand the relationship between some small scale (household) processes with region wide transformations. However, the view of the internal dynamics of the settlements is still partial and blurred. One avenue of future research involves the implementation of a program of a higher resolution survey inside settlements, as well as the excavations of neighborhoods and houses, to analyze how the differences and changes observed at regional scale is reflected between households inside the communities.

A second avenue of research is to a comparable survey of the lower portion of the Nepeña Valley. This will make it possible to compare the two cultural zones emerging during the Final Formative: the balkanized Middle Valley and the complex polity centered in Caylán in the Lower Valley. This research will also clarify the existence of a possible buffer zone between these two Valley sections.

In this dissertation, the analysis of the sociopolitical trajectory of the Nepeña Middle Valley, serves to demonstrate the potential of the crises framework to explain not only the continuing cycles of rise-and-collapse, valleys-and-peaks, integration-disintegration of prehispanic societies, but it could serve as a guide to a more profound investigation of the interplay between structure and agency during crisis periods.

APPENDIX A

ANALYSIS OF GARGABE DISPERSION IN MODERN RURAL HOUSEHOLDS

The survey methods used in this dissertation rely on the assumption that rural households dispose their garbage in the rough vicinity of where they are living, in the absence of more coordinated trash management as usually exists in urban areas. Drennan and Boada (2006) carried out a study to determine empirically how large are the garbage scatters produced by single rural households in the Colombian Andes. Ten households were chosen, and the distribution of different kinds of garbage was recorded, from very light materials such as paper, to very heavy materials such as bricks or tiles. They estimate that a household with an average occupation of three hundred years will produce an artifact scatter of nearly one hectare (9324m²). The study also revealed that the rate of artifact dispersal is usually higher at the beginning and become much slower through time.

The goal of Drennan and Boada (2006) was to relate artifact dispersion area with the number of households residing in a specific territory. My goal, however, was to determine if the conclusions of Drennan and Boada (2006) are also valid for the Peruvian coast, and whether survey units of maximum 1 ha in area were adequate to capture the refuse footprint of a household. For instance, in the hypothetical case where most of the households tend to dispose of garbage 400 meters away, we should be very careful of the spatial relations we are reconstructing with such artifacts. In contrast with the Colombian Andes, the coastal valleys of Peru lacked frequent rainfall and major forest cover during most part of the Holocene, and this may differentiate the post-depositional processes affecting the movement of artifacts in both areas, as well as preservation. In addition, in these Peruvian coastal valleys, when the land is not under the property of large land owners such as sugar cane companies, they are usually divided in small garden plots (*chacras*) separated by fences which shaped how artifacts can be displaced.

The study was carried out in 2011 in eight rural households around the town of Nepeña (Figure A-1). They were chosen because: a) they belong to peasants, b) they were located outside the main town, c) the dwellings were located infield, and d) farming was minimally or not mechanized.



Figure A- 1 Location of the rural households of this study. Nepeña town is visible in the center of the image. Google Earth 2014.

I gathered information on the length of household occupation, the approximate number of members for every decade of occupation, and the boundaries of the *chacra* or the section of it that has been frequently used (Figure A- 2, Table A- 1). In every household between two and four transects were carried out depending on the shape and size of the plot. Then I recorded the individual location and description of each element in each transect with a GPS and field notes. All the records were categorized in three groups: Heavy trash (metal artifacts, ceramic, glass, wood, food remains, heavy plastic, heavy paper, and building refuse), light trash (light plastic as cookies wrapping and light paper), and concentrations (trash piles and ash concentrations). The exploratory analysis was carried out with the objective of acknowledge: a) at what distances most of the garbage would be usually found? b) Are these distances dependent on the household size, length of occupation or *chacra* size?

The initial exploration indicates difference in the dispersion of the garbage according to its kind (Table A- 2). As expected, heavy garbage tend to disperse closer to the dwelling than light garbage.

Concentrations of garbage tend to be little further than heavy garbage, but much closer than light ones. Even if they represent light materials such as leaves or feathers, these concentrations involve the movement of relatively heavy trash.

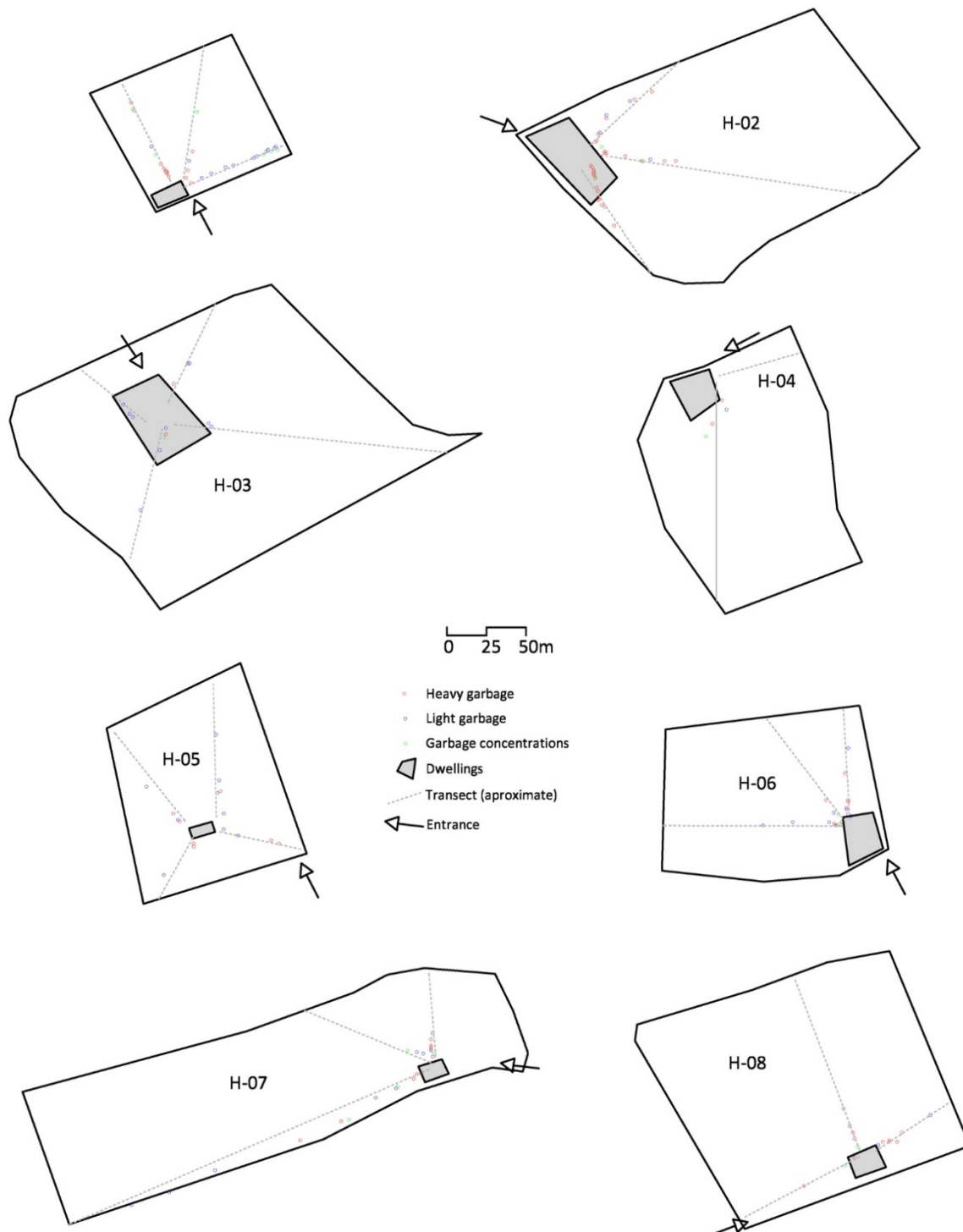


Figure A- 2 Location of survey transects and the findings in each house.

Table A- 1 Basic information on studied households.

House	Approx. Years of Occupation	Average Household Size (persons)	Number of Transects	# Light Garbage	# Heavy Garbage	# Garbage Concentrations
H-01	20	5.5	3	12	16	6
H-02	40	4.25	3	4	41	3
H-03	40	2	4	10	2	1
H-04	30	1	2	1	2	1
H-05	20	5	4	9	9	
H-06	70	3.43	3	12	11	2
H-07	60	3.5	3	9	11	4
H-08	80	6.13	3	4	13	2

Table A- 2 Average distances for each type of garbage from the houses

	N	Min	Max	Mean	Sd
Heavy	105	5.1	97.6	20.8	15.7
Light	61	7.1	211.6	37	38.2
Concentrations	19	6.3	68	30.1	22.4

The archaeological remains that is usually recorded in surface during fieldwork are mainly stone tools and pottery fragments. These remains are relatively heavy materials, so I expect these objects dispersed in similar way heavy trash (cans, bottles, bricks, etc.) or trash concentration does. Consequently, I explored the patterns of garbage dispersion using both all the remains and only heavy garbage and garbage concentrations separately (Table A- 3).

The results (Table A- 4) indicate that in most of the cases, there is less than 1% chance that garbage will be found further than 70 meters from the dwellings. However, this estimation include all kinds of remains, if only heavy materials are considered, there is a very high chance that most of the remains will be located inside the next 50.5 meters from the dwellings.

Table A- 3 Result of the analysis of distance of dispersion of the garbage.

House	Transect	Maximum Distance of the Garbage		Distance of the Fence
		Everything	Only Heavy	
H-01	1	60.4	60.4	74
H-01	2	48.8	48.8	88
H-01	3	68	68	70
H-02	4	54.5	54.5	76
H-02	5	53.2	53.2	167
H-02	6	48	48	77
H-03	7	50.1	34	68
H-03	8	38.2	-	173
H-03	9	49.5	9	89
H-03	10	25.4	-	55
H-04	11	31	31	138
H-04	12	-	-	54
H-05	13	35.2	11.1	45
H-05	14	41.1	17.2	82
H-05	15	61.4	28.8	92
H-05	16	53.8	53.8	58
H-06	17	50	34.1	70
H-06	18	55	13.3	115
H-06	19	22.7	22.7	83
H-07	20	211.6	97.6	248
H-07	21	19.2	19.2	87
H-07	22	20	16.1	59
H-08	23	44.4	44.4	85
H-08	24	35.8	35.8	120
H-08	25	48	27	58

Table A- 4 Maximum Limit of Garbage Dispersion From the Dwellings.

	Transects	Mean (m)	St Dv (m)	ER 80%	ER 95%	ER 99%
Garbage – All	25	51.1	35.9	9.36	14.66	19.86
Only Heavy and Concentrations	22	37.6	21.2	5.99	9.42	12.82

When the data on the maximum distance of the garbage and the distance of the fence per transect is compared, and leaving the outlier out (Transect 20), there is no relationship between these variables (Figure A- 3). In other words, the distance of the fence does not explain the variability in

maximum distances of all the garbage ($r = 0.005$, $p = 0.981$), nor the dispersion of heavy garbage and concentrations ($r = 0.005$, $p = 0.754$)

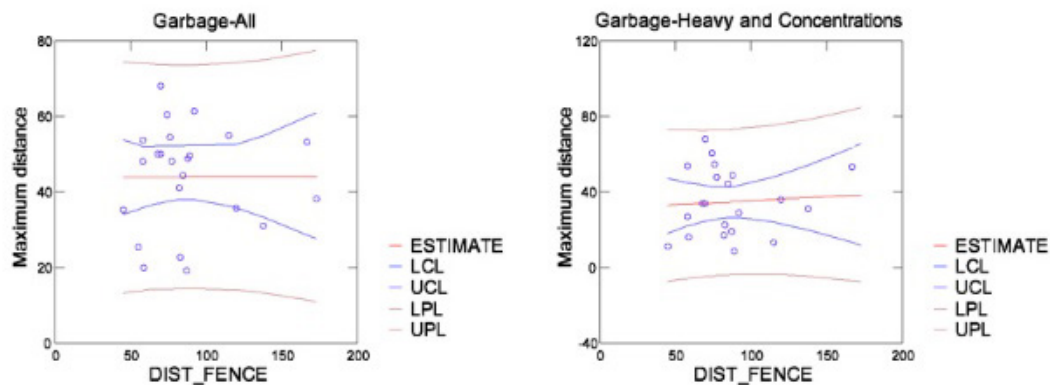


Figure A- 3 Scatterplots of the transect comparing the maximum distance of garbage and the distance of the fence.

In order to compare the maximum dispersion of garbage with the length of the occupation and the household size, the average distance was obtained for each house (Table A- 5). Then this data was compared with the length of occupation (Figure A- 4) and the average household size (Figure A- 5). The years of occupation of the house cannot explain the variance of the dispersion of neither all the garbage ($r = 0.083$, $p = 0.845$) nor the dispersion of only the heavy garbage and concentration ($r = 0.231$, $p = 0.581$). The average size of the household can explain only a small part of the variance of the dispersion of garbage even if everything ($r = 0.305$, $p = 0.462$) or just the heavy garbage and concentrations ($r = 0.465$, $p = 0.245$) are analyzed.

Table A- 5 Consolidated data by house.

House	Average Maximum distance (meters)	
	Everything	Only Heavy and Concentrations
H-01	59.1	59.1
H-02	51.9	51.9
H-03	40.8	21.5
H-04	31	31
H-05	47.9	27.7
H-06	42.6	23.4
H-07	83.6	44.3
H-08	42.7	35.7

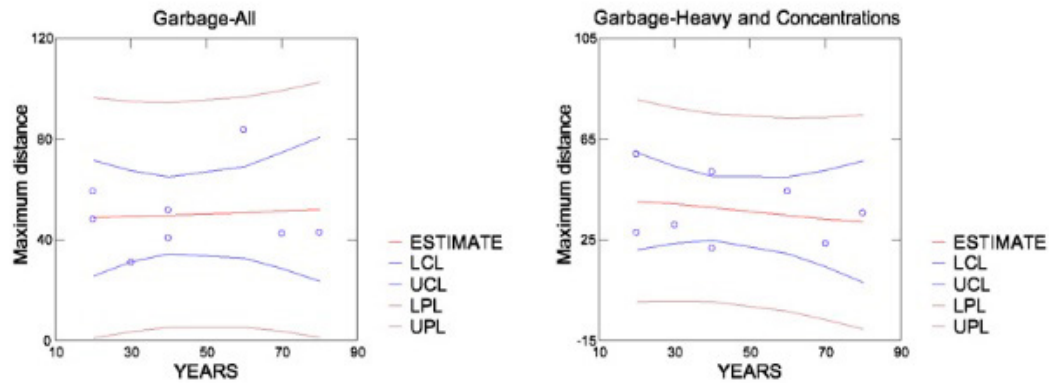


Figure A- 4 Scatterplot of houses comparing the maximum distance of garbage and the years of occupation.

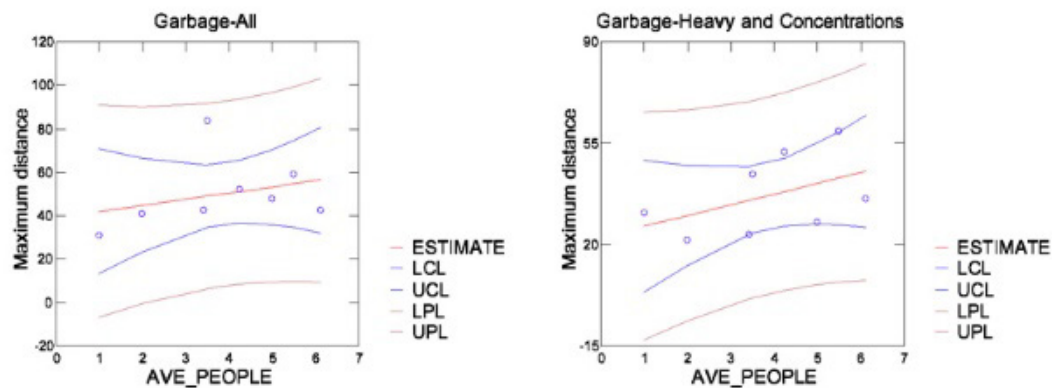


Figure A- 5 Scatterplot of houses comparing the maximum distance of garbage and the average household size.

This brief study has shown that Peruvian coastal rural households would dispersed their garbage mostly within 50 meters from the residence (Figure A- 6). This distribution is not affected by the shape and area of the garden plot or *chacra* indicating that the results could be applicable to other cases despite the differential size or the absence of formal boundaries. The length of occupation did not affect the dispersion suggesting that this conclusion is valid for any household despite their antiquity. However, there is a small influence of the household size, indicating that larger the family more likely that garbage will be more dispersed. However, if more than 6-7 people are residing in the area, it is very likely that two nuclear families are living together and the larger dispersion correspond to two household units and not only one.

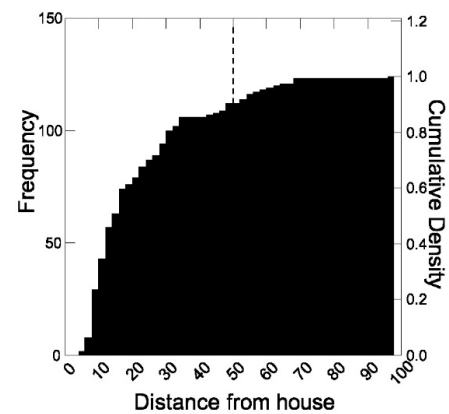


Figure A- 6 Cumulative frequency of heavy garbage and concentrations according to the distance to the house

APPENDIX B

CERAMIC ANALYSIS: METHODOLOGY AND TYPES DESCRIPTIONS

The fabric or paste types are the result of the classification of tendencies in the association between kinds of clays and tempers (Orton, et al. 1993; Rice 1987). In nature, clays could contain a wide range of non-clay impurities known as inclusions which, depending on their kinds and proportions, could decrease the plasticity of the clay when moisten. This is a desirable property because it increases the resistance of the unfired clay object to plastic deformation. When inclusions are not enough in quantity or lack the desired properties, temper is added, being very common the use of sand, crushed rocks, organic material, etc. The combination of raw clays –with inclusions- and certain kinds of temper are cultural products of recurrent practices –habitus- as well as the result of technological innovation resulted from user's demands, depletion of raw material sources, etc. (Arnold 1988; Braun 1983; Rice 1987; Skibo 1992).

The clay matrix was analyzed according to its texture and compactness or porosity. If the fresh cut of a sherd felt very rough to the touch, it was described as very coarse grain texture. By contrast, if it felt very homogeneous and flat, it was described as fine grain texture. During the analysis, a lot of care was taken to avoid the influence of single large temper grains, or the effects of erosion in the fragments.

The compactness and porosity of the sherds were determined by a quick view of the proportions of holes and pits in the ceramic matrix. Compactness and porosity is used interchangeable considering their opposite relationship. Sometimes the shape of the porous was used to determine the origin of the clays (for instance, tubular porous results from plant structures such as fine roots), or the technique of manufacture (flat porous may result from the application of stress in the surfaces as in the “paleteado” technique).

The classification of the temper was based in their type, quantity or proportion, size and sorting level. The type of temper was determined using the Table A.2 in Orton et. al. (1993). The quantity, size

and sorting were determined using the Sand Grain Size chart designed by Gamma Zeta Chapter of Kent State University.

Surface treatment techniques could modify the properties of surfaces of the vessels. A smoothed finishing can be obtained by the homogenization of the surface using a soft object such as maize cobs, gourd fragments, pieces of cloth or reused sherds (scrapers). Sherds can be also modified by a strong burnishing or polishing - increasing its hardness and light reflection properties-, or by scraping -increasing porosity and roughness-. Both techniques, burnishing and polishing, require the use of an object with a hard surface such as metal polisher, a polished stone, *Pouteria lucuma* seeds, etc., but polishing involves a more time consuming labor. Polishing is used to obtain a very compacted and homogeneous surface, which enhance its reflective properties –brightness-, making vessels highly visible even under conditions of low luminosity. By contrast, burnishing while following similar techniques, it leaves traces of the polishers. Polishing and strong burnishing are ubiquitous in many fine pottery of the Central Andes, and this association was exploited in this dissertation to identify fineware.

Firing conditions is highly dependent of environmental conditions. Natural vegetation, weather conditions –especially moisture and precipitation-, and the physical properties of the vessels –resulted from paste types, manufacture technique and vessel shape- are considered in the potter’s choice of the firing technique. The increased presence of larger vessels, increased hardness and more frequent bright colors through time may be indications of improvements in firing techniques in the region (Ikehara 2010). Firing conditions and clay kind determine the Chroma and value of the colors of the matrix. Higher temperatures produce pottery with higher values colors, while longer times in an oxidizing environment may create ceramics with higher Chroma colors. These variables were determined using a Munsell Soil Color Chart. Additionally, changes of firing atmosphere and the duration was determined observing the layering and coloring of the matrix by comparison with the Figure 11.1 from Orton et al. (1993).

The associated types of ceramic artifacts, vessel forms, and decorative techniques, for each ware type include only the most ubiquitous (proportions higher than 10% of the total of each ware). Examples of the artifact and decoration variability in each ware are presented in the following plates.

B.1 WARE DESCRIPTIONS AND DRAWINGS

*Note: The codes between parentheses are the original code used for each ware during the analysis and those used to tag the bags with the classified sherds in each collection.

Ware I-A (L2)

Paste: The matrix shows a medium grain texture, low porosity and it is tempered with very coarse sand (1-2 mm), fairly sorted, and in proportions between 10 and 20%. The temper is alluvial in origin with a mixed composition of semi-angular quartz/quartzite and very rounded dark volcanic rocks (probably basalt).

Firing: Irregular, with low temperatures and oxidizing atmosphere that produce friable vessels with dull brown to beige colors (core: 5YR 4/2-dark reddish gray, 7.5YR 3/2 dark brown; surface: 5YR 4/2-dark reddish gray, 7.5YR 4/3-brown).

Surface treatment: Exposed surfaces smoothed by hand, internal surfaces smoothed by hand or scraped by a hard object (cf. ceramic scrapers from reused sherds)

Forms: Neckless jars, flat-based bowls and necked jars are common. Bottles (including stirrup-spout), basins, gourd-shaped bowls, carinated bowls and platters were also found. Other objects: scrapers from reused sherds.

Decorative techniques: Textured surfaces with appliqués and/or point and linear incisions, fine grooved incisions, broad grooved incisions delineating figures (probably Cupisnique related), and stamped double circles.

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware I-B (R)

Paste: The matrix shows a very fine texture, high degree of compactness, and it is tempered with very fine sand (up to 1/16 - 1/8 mm), well sorted, and in proportions lower than 5%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rock (probably basalt). Some specimens have few larger (~2 mm.) rock tempers.

Firing: Regular, with medium to high temperatures and reducing atmosphere that produces a hard Paste with dark to light gray colors (core: GLEY1-5/N-gray; surface: GLEY1-2.5/N-black). Some specimens show an irregular blackening by smoking.

Surface treatment: Heavily burnished and polished.

Forms: Bottles (inc. stirrup spout) and flat-based bowls. Other objects: scrapers from reused sherds.

Decorative techniques: Broad grooved incisions delineating figures (probably Cupisnique related)

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware I-C (A3)

Paste: The matrix shows a medium grain texture, moderate porosity, with inclusions of medium (1/4 - 1/2 mm) to coarse (1/2 - 1 mm) grain size and in proportions higher than 20%. The inclusions may have been present in the clay since its source and it includes angular and semi-angular white and beige rocks (quartzite and/or feldspars), and some scattered tiny dark rocks. This Paste was prepared using natural clays with minimum cleaning and without adding temper. It is similar to the Paste of Ware II-B. An identified clay source of similar composition was found adjacent to the road northwest of Kushipampa site.

Firing: Irregular and incomplete with very low temperatures in an oxidizing atmosphere that produces very dark (Core: 5YR 2.5/2-dark reddish brown, 7.5YR 2.5/1-black; surface: 7.5YR 3/2-dark brown, 7.5 YR 4/3 brown) and friable vessels. The dark colors may be related to residual carbon left by the short firing time.

Surface treatment: Mainly smoothed by hand and some irregular burnishing.

Forms: Bottles (inc. stirrup spout), neckless jars, flat-based bowls, and necked jars are common.

Decorative techniques: Grooved incisions, textured surfaces by point incisions and rocker stamping.

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware I-D (O)

Paste: The matrix shows a very fine grain texture, high degree of compactness, and it is tempered with medium size (1/4 - 1/2 mm) to coarse (1/2 - 1 mm) sand, well sorted, and in proportions lower than 5%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rock (probably basalt). Because the temper's very low frequency, they may be naturally occurring sand the clay source.

Firing: Regular with medium temperatures, in an oxidizing atmosphere and long periods that produces vessels of medium hardness and dark brown tones (core: 5YR 4/2-dark reddish gray; surface: 5YR 4/1-dark gray)

Surface treatment: Mostly fine finishing between intense burnishing and polishing.

Forms: Bowls, flat-based bowls, and bottles (stirrup-spout) are common. Gourd-shaped bowls and discs were also found.

Decorative techniques: Fine incisions, broad grooved incisions, textured surfaces by point and lineal incisions, appliqués and combing, post-fired incisions and pattern burnished on highly burnished surface.

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware I-E (P)

Paste: The matrix shows a fine grain texture, moderate porosity, and it is tempered with coarse sand (1/2 – 1 mm), fairly sorted, and in proportions between 5 and 10%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rock (probably basalt).

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels of moderate hardness and weak to very dark black tones (core: 2.5YR 4/4-reddish brown, surface: 5YR 4/1-dark gray, 5YR 3/2-dark reddish brown).

Surface treatment: Blackness by smoking with intense burnishing and polishing.

Forms: Flat-based bowls, bowls, and dish/plates are common. Bottles and carinated bowls were also found.

Decorative techniques: Pre-fired scratched, combing, and grooved incisions.

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware I-F (Y)

Paste: The matrix shows a fine grain texture, moderate porosity, and it is tempered with medium size (1/4 – 1/2 mm) to coarse (1/2 – 1 mm) sand, well sorted, and in proportions between 5 and 10%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rock (probably basalt).

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels of moderate hardness and brown/orange tones (core: 2.5YR 3/2 dusky red; internal surface: 2.5YR 4/2- weak red; external surface: 2.5YR 4/4 reddish brown; slip color: 10R 4/6-red)

Surface treatment: Red slip in the exposed surfaces, and burnishing and/or polishing as final treatment.

Forms: Flat-based bowls.

Decorative techniques: -

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware I-G (X)

Paste: The matrix shows a fine grain texture, moderate compactness, and it is tempered with fine size sand (1/8 – 1/4 mm), well sorted, and in proportions lower than 5%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rock (probably basalt).

Firing: Regular, medium temperatures, in a reducing atmosphere, and short time that produces vessels with very dark colors in the core (7.5YR 2.5/1-black) and intense black surfaces (GLEY1-2.5/N-black).

Surface treatment: Blackness by smoking and highly polished.

Forms: Gourd-shaped bowl and flat-based bowl.

Decorative techniques: -

Chronological assessment: 800-450 B.C., Late Formative Period.

Ware II-A (B)

Paste: The matrix shows a medium grain texture, with moderate porosity, inclusions of coarse grain size (1/2 - 1 mm), fairly sorted, and in proportions higher than 20%. The inclusions may have been present in the clay since its source and correspond mainly to angular and semi-angular quartzite, and some scattered tiny dark rocks. This Paste is similar to Ware I-C and II-B.

Firing: Regular, medium to high temperatures, and an initial reducing atmosphere with a rapid exposure to an oxidizing atmosphere that produces a layered coloration with gray or dark brown cores (7.5YR 3/1-very dark gray, 7.5YR 3/2-dark brown, 7.5YR 4/1-dark gray, 7.5YR 5/1-gray) and brown with pinkish and purplish tones deep to 1 to 2 mm from the surface (2.5YR 6/4 light reddish brown-, 5YR 4/2-dark reddish gray, 10R 6/3-pale brown).

Surface treatment: External surfaces have variable treatments from smoothing to burnishing. Some specimens have polished surfaces. The internal surfaces of restricted vessels have a rough smoothing with grooves produces by the use of a hard scraper (see scrapers from reused sherds)

Forms: Neckless jars (including jars with lateral spout) are the main component of this ware. Bottles, basins, necked jars, carinated bowls, pitchers, necked cooking-pots, flat-based jars, and oversized vessels were also found. Other objects are: scrapers, discs, and rectangle-shaped reused sherds.

Decorative techniques: Decoration is uncommon. Mainly scratching, combing, band-appliqués, and incises (banded lozenge), circle impressed, etc.

Chronological assessment: 800-150 B.C., late part of the Late Formative, and Final Formative.

Ware II-B (A1)

Paste: The matrix shows a medium grain texture, moderate porosity, inclusions of medium size (1/4 - 1/2 mm) to coarse (1/2 - 1 mm) grain size, and in proportions higher than 20%. The inclusions may have been present in the clay since its source and it includes angular and semi-angular white and beige rocks (quartzite and/or feldspars), and some scattered tiny dark rocks. This Paste was prepared using natural clays with minimum cleaning and without adding temper. It is similar to the Paste of Ware I-C. An identified clay source of similar composition was found adjacent to the road northwest of Kushipampa site.

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produce vessels slightly friable and reddish brown tones (core: 2.5YR 4/6-red, 5YR 4/3-reddish brown, 7.5YR 6/4-light Brown; surface: 2.5YR 4/4- reddish brown, 2.5YR 6/6-light red).

Surface treatment: Exposed surfaces treatment varies from smoothing by hand to heavily burnished, and some specimens are polished. The internal surfaces have a rough smoothing with grooves produces by the use of a hard scraper (see scrapers from reused sherds)

Forms: Neckless jar (including jars with lateral spout) and flat-based bowls are common. Bowls, bottles, basins, necked jars, carinated bowls, gourd-shaped bowls, platters, short-necked jars, and oversized vessels are also found. Other objects: scrapers from reused sherds, discs and rectangle-shaped reused sherds.

Decorative techniques: Pattern burnished and post-fired scratched were frequently used. Linear incisions and stamping were used for a wide array of designs (sinuous bands, banded lozenge, and circle-and-dot), textile impressed, and appliqués.

Chronological assessment: 450-150 B.C., Final Formative Period.

Ware II-C (A2&L3)

Paste: The matrix shows a medium grain texture, moderate porosity, and it is tempered with very coarse sand (1-2 mm), fairly sorted, and in proportions between 10 and 20%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rock (probably basalt). In one variant (A2) the temper has only tiny amounts of dark rocks.

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produce vessels with moderate hardness. The final appearance is similar to Ware II-B with reddish brown colors (core: 2.5YR 5/6-red, 2.5YR 5/8-red; surface: 2.5YR 4/4 reddish brown, 2.5YR 4/6 red)

Surface treatment: Exposed surfaces treatment varies from smoothing by hand to heavily burnished, and some specimens are polished. The internal surfaces have a rough smoothing with grooves produced by the use of a hard scraper (see scrapers from reused sherds)

Forms: Neckless jar (including jars with lateral spout) and flat-based bowls are common. Bowls, bottles, basins, necked jars, carinated bowls, gourd-shaped bowls, platters, short-necked jars, and oversized vessels were also found. Other objects: scrapers from reused sherds, discs and rectangle-shaped reused sherds.

Decorative techniques: Pattern burnished and post-fired scratched were frequently used. Linear incisions and stamped were used for a wide array of designs (sinuous bands, banded lozenge, circle-and-dot), textile impressed, appliqués, and point incisions were used to create textured surfaces. One specimen with white and black paint was recorded.

Chronological assessment: 450-150 B.C., Final Formative Period.

Ware II-D (V)

Paste: The matrix shows a medium grain texture, moderate porosity, with inclusions of medium size (1/4 - 1/2 mm) to coarse (1/2 - 1 mm) grain size, well sorted, and in proportions higher than 20%. The inclusions may have been present in the clay since its source and correspond mainly to angular and semi-angular white and beige rocks (quartzite and/or feldspars) similar to II-B. This clay was tempered with sand of probable alluvial or Aeolian origin composed by semi-angular quartz/quartzite and semi-rounded dark volcanic rocks (probably basalt). This Paste is similar to Ware III-F

Firing: Regular, medium temperatures, in an initial short-time reducing atmosphere that leaves a very dark core color (GLEY1 3/N-very dark gray, GLEY1 2.5/N-black), due the presence of residual carbon, followed by a final sudden short-time exposure to highly oxidizing atmosphere that leave a reddish tone (10R 5/4-weak red, 10R 4/6-red) in the surface. These vessels have a moderate hardness.

Surface treatment: Careful smoothing.

Forms: Bottles, short-necked bowls, plates/dishes and flat-based bowls.

Decorative techniques: -

Chronological assessment: 450-150 B.C., Final Formative Period.

Ware III-A (T)

Paste: The matrix shows a medium grain texture, moderate porosity, with inclusions of medium (1/4 - 1/2 mm) to coarse (1/2 - 1 mm) grain size, well sorted, and in proportions higher than 20%. The inclusions

may have been present in the clay since its source and correspond mainly to angular and semi-angular white and beige rocks (quartzite and/or feldspars) similar to II-B. This clay was tempered with crushed angular shiny black elongated rocks (probably ferromagnesian mineral: hornblende?)

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels with moderate hardness and brown to dark brown tones (core: 5YR 5/4-reddish brown; surface: 2.5YR 5/6-red)

Surface treatment: Mainly smoothed by hand.

Forms: Bowls, necked jars, neckless jars and flat-based bowls are common. Bottles, basins, carinated bowls, short-necked bowls, gourd-shaped bowls, pitchers, short-necked jars and oversized jars were also found. Other objects: discs and scrapers from reused sherds.

Decorative techniques: Post-fired scratched, fine incisions, textured surfaces by point incisions, and impressed (circle-and-dot)

Chronological assessment: 450 B.C.-A.D. 500, Final Formative Period and Early Intermediate Period.

Ware III-B (S)

Paste: The matrix shows a fine grain texture, moderate compactness, and it is tempered with medium size (1/4 – 1/2 mm) sand, well sorted, and in proportions between 5 and 10%. The temper is pure quartz/quartzite sand or sand of mixed composition of quartz/quartzite and dark volcanic rock, probably of alluvial or Aeolian in origin.

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels with moderate hardness and light brown to beige tones (core: 10YR 7/2-pinkish gray, 10YR 7/3-pink; surface: 7/5YR 5/4-brown)

Surface treatment: Fine finishing varying from a very careful smoothing to polishing.

Forms: Bowls, small jars and flat-based bowls.

Decorative techniques: Painted with red, white and/or black pigments. Pattern burnished of vertical lines was recorded in the neck of the small jar.

Chronological assessment: 150 B.C.-A.D. 500, Early Intermediate Period.

Ware III-C (C)

Paste: The matrix shows a very fine grain texture, high compactness, and inclusions are scarcely present. Kaolin clay was used and the few very fine (1/16 – 1/8 mm) inclusions have an earthy appearance and vary from white to reddish brown colors and may be hematite impurities from the source.

Firing: Regular, high temperatures, in an oxidizing atmosphere that produces hard brittle vessels with bright white and cream tones (core: 7.5YR 8.5/2-pinkish white, 10YR 9.5/2-pale orange yellow, 2.5Y 9/2-very pale yellow; surface: 10YR 8/2-very pale brown, 10YR 9.5/2-pale orange yellow).

Surface treatment: Fine finishing varying from a very careful smoothing to polishing. Some specimens were covered with a probably brownish orange slip.

Forms: Bowls (including bowls with pedestal base), bottles, small jars and flat-based bowls.

Decorative techniques: Painted with orange, brown and black pigments. Orange and brown pigments were used for slipping the exposed surfaces.

Chronological assessment: 150 B.C.-A.D. 500, Early Intermediate Period.

Ware III-D (Q)

Paste: The matrix shows a very fine grain texture, high compactness, and inclusions are scarcely present. The few very fine (1/16 – 1/8 mm) inclusions have an earthy appearance and vary from white to reddish brown colors and may be hematite impurities from the source

Firing: Regular, medium to high temperatures, in an oxidizing atmosphere that produces hard brittle vessels with orange to brown tones (core: 2.5YR 5/6-red; surface: 2.5YR 4/8-red)

Surface treatment: Fine finishing varying from a very careful smoothing to polishing. White pigment slip has been recorded.

Forms: Bowls and bottles.

Decorative techniques: Painted with black and/or red pigments.

Chronological assessment: 150 B.C. – A.D. 500, Early Intermediate Period.

Ware III-E (N)

Paste: The matrix shows a medium grain texture, moderate porosity, and it is tempered with coarse sand (1 – 2 mm), poorly sorted, and in proportions between 10 and 20%. The temper is sand of probably alluvial origin in which prominent well rounded quartz crystals are visible.

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels of moderate hardness and beige colors with some weak greenish tones (core: 7.5YR 6/4-light brown, 2.5YR 5/6-red; surface: 5YR 5/6-yellowish red, 2.5YR 5/6-red, 5YR 5/2-reddish gray)

Surface treatment: Smoothing using an uneven but soft material (i.e. textile or cob)

Forms: Necked jars, neckless jars, bowls and flat-based bowls are common. Bottles, gourd-shaped bowls, necked cooking-pots, and oversized jars are also found. Other objects: scrapers from reused sherds.

Decorative techniques: Coarse and rough combing, painted with white pigment on red slip, post-fired scratched, and fine incisions.

Chronological assessment: 150 B.C. – A.D. 500, Early Intermediate Period.

Ware III-F (J)

Paste: The matrix shows a medium grain texture, moderate porosity, with inclusions and temper of medium size (1/4 - 1/2 mm) to coarse (1/2 - 1 mm) grain size, fairly sorted and in proportions higher than 20%. The inclusions may have been present in the clay since its source and correspond mainly to angular and semi-angular white and beige rocks (quartzite and/or feldspars) similar to II-B. This clay was tempered with sand of probable alluvial or Aeolian origin composed by semi-angular quartz/quartzite and semi-rounded dark volcanic rocks (probably basalt) of coarse sand size (1/2 – 1mm). This Paste is similar to Ware II-D. This ware seems to be a mixing of the Paste of I-C/II-B/II-C and alluvial/Aeolian sand.

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels with moderate hardness and brown to dark brown tones (core: 2.5YR 4/4-reddish brown, 2.5YR 4/6-red, 2.5YR 5/6-red; surface: 2.5YR 4/3-reddish brown, 2.5YR 5/6-red, YR 5/3-reddish brown).

Surface treatment: Variable from smoothing to burnishing. Some specimens were polished.

Forms: Necked jars, neckless jars, and flat-based bowls are common. Bowls, bottles, basins, carinated bowls, gourd-shaped bowls, platters, pitchers, necked cooking-pots, plates/dishes, oversized bowls were also found. Other objects: scrapers from reused sherds, discs, trumpets, figurine, and rectangle-shaped reused sherd.

Decorative techniques: Post-fired scratched, appliqués, impressed (circles, broad dots), painting with white pigments, modeled and fine incisions.

Chronological assessment: 150 B.C. – A.D. 500 (Early Intermediate Period)

Ware IV-A (L1)

Paste: The matrix shows a medium grain texture, moderate porosity, and it is tempered with very coarse sand (1 – 2 mm), fairly sorted, and in proportions between 10 and 20%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and rounded dark volcanic rock (probably basalt).

Firing: Regular, medium to high temperatures, in an oxidizing atmosphere that produces durable vessels of orange and beige tones (core: 2.5YR 5/8-red, 5YR 5/4-reddish brown; surface: 2.5YR 5/8-red, 7.5YR 5/3-brown). Some specimens show a grayish core of an incomplete oxidation due a short time firing.

Surface treatment: Mostly smoothed by hand. There are some specimens with polishing, but burnishing is rare. Some vessels have a white/cream slip in their exposed surfaces.

Forms: Necked jar and necked cooking-pots are common. Bowls, carinated bowls, gourd-shaped bowls, bottles, “*cancheros*”, cups with high pedestals, “*floreros*”, graters, pitchers, plates/dishes, short-necked jars, and oversized vessels are also present. Other objects: scrapers from reused sherds, “*platos de alfarero*”, discs, miniatures, molds, and rectangle-shaped reused sherd.

Decorative techniques: Painted with white and black pigments, white/cream slip, modeled and molded (Moche style); painted with white, red and black pigment (Huari Norteño style); triangle-shaped impressions (Gallinazo/Suchimancillo style)

Chronological assessment: 500 B.C. – 800 A.D., Early Intermediate Period (?) and Middle Horizon Period.

Ware IV-B (F3)

Paste: The matrix shows a medium grain texture, moderate porosity, and it is tempered by coarse sand (1/2 – 1mm), well sorted, and in proportions higher than 30%. The temper is sand of alluvial or Aeolian origin of mixed composition of semi-angular quartz/quartzite and semi-rounded dark volcanic rocks (probably basalt).

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces vessels of moderate hardness and orange to brown tones (core: 2.5YR 4/6-red; surface: 2.5 YR 5/4-reddish brown),

Surface treatment: Rough smoothing by hand or by the use of an uneven soft material (i.e. maize cob or textile)

Forms: Oversized vessels (“*tinajas*” and “*botijas*”), necked jars and basins are common. Necked cooking-pots, neckless jar, flat-based bowl, bottles, dishes/plates were also found. Other objects: scrapers from reused sherds, a disc, “*platos de alfarero*”, miniature and architectural models.

Decorative techniques: Mold impressed, post-fired scratched and painted with red and white pigments.

Chronological assessment: A.D. 500 – 800, Middle Horizon Period.

Ware IV-C (I)

Paste: The matrix shows a very coarse grain texture, very compact, and it is tempered by granules (2 – 4mm) to pebbles (4 mm+) size rocks, moderately well sorted, and in proportions larger than 30%. The temper is a probably crushed rock which was originally composed by large proportions of quartz and quartzite. Because almost no alluvial or Aeolian erosion affected the crushed rock, they have facets and very sharp edges.

Firing: Irregular, medium temperatures, in an oxidizing atmosphere that produces durable vessels of beige to light brown tones (core: 5YR 5/3-reddish brown, 2.5YR 4/4 reddish brown; surface: 7.5YR 5/3 brown, 2.5YR 5/3 reddish brown)

Surface treatment: Rough smoothing by the use of an uneven and textured object (textile or maize cob)

Forms: Oversized vessels (“tinajas”) are common, necked jars were also found.

Decorative techniques: -

Chronological assessment: 150 B.C. – A.D. 800, Early Intermediate Period and Middle Horizon Period.

Ware IV-D (D)

Paste: The matrix shows a fine grain texture, moderately compact, and it is tempered with fine (1/8 – 1/4mm) and medium (1/4 – 1/2mm) size sand, good sorted, and in proportions lower than 5%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and rounded dark volcanic rock (probably basalt).

Firing: Regular, medium to high temperatures, in an oxidizing atmosphere that produces vessels of moderate hardness and orange tones (core: 2.5YR 5/6-red; surface: 2.5YR 4/6 red, 2.5 YR 4/8 red; black slip: 7.5 YR 4/1-dark gray; black paint: 7.5YR 3/1-very dark gray; cream slip and paint: 10YR 8/3-very pale brown).

Surface treatment: Varies between careful smoothing and polishing. IV-D/1 specimens sometimes show red or cream slip.

***Subtype IV-D/1**

Forms: Bottles (stirrup spout, spout with lateral handle, double spout and bridge, and simple spout), necked jars, and flat-based bowls are common. Bowls, “*cancheros*”, gourd-shaped bowl and a plate/dish were also found. Other objects: reused sherd scraper, figurines and miniatures.

Decorative techniques: Impression by mold, painting with mainly red and white pigments, appliqués, modeled (Moche and Gallinazo style).

Chronological assessment: A.D. 500-800, Middle Horizon Period, probably beginning around A.D. 400.

***Subtype IV-D/2**

Forms: Bowls, simple spout bottles, plate/dishes, flat-based bowl are common. Necked jars, gourd-shaped bowls, “*kero*” vase were also found. Other objects: scrapers from reused sherds and a whorl.

Decorative techniques: Impression by mold, painting by red, white and black pigments (Huari Norteño style).

Chronological assessment: A.D. 500-1000, Middle Horizon Period.

***Subtype IV-D/3**

Forms: Only small necked cooking-pots were found.

Decorative techniques: Impressed by mold (*“piel de ganso”*)

Chronological assessment: A.D. 1000-1400, Late Intermediate Period.

Ware IV-E (E)

Paste: The matrix shows a fine grain texture, moderately compact, and it is tempered with fine sand (1/8 – 1/4mm), well sorted, and in proportions between 5 and 10%. The temper seems to be alluvial in origin, with a mixed composition of semi-angular quartz/quartzite and rounded dark volcanic rock (probably basalt).

Firing: Regular, medium temperature that produce vessels with hard pastes and beige-orange to light brown tones (core: 7.5YR 5/3-brown, 5YR 5/6-yellowish red; surface: 7.5YR 5/3-brown; engobe rojo: 10R 4/4-weak red).

Surface treatment: Very careful smoothing and polishing. Some specimens have orange or red slip.

Forms: Flat-based bowls, necked jars, and simple spout bottles are common. Bowls, small necked cooking-pots, and plate/dishes were also found. Other object: scraper from reused sherds.

Decorative techniques: Painted with black, white and sometimes red pigments (Huari Norteño style, compare with IV-D/2)

Chronological assessment: 500-1000, Middle Horizon Period.

Ware V-A (K)

Paste: The matrix shows a coarse grain texture, moderately compact, and it is tempered with very coarse (1 – 2 mm) elements, well sorted, and in proportions around 20%. The temper is sand with a mixed composition of crushed quartzite rocks, and sand of mixed composition with semi-angular quartz and black semi-rounded rocks (probably basalt). This is similar than V-B but with lower proportions of temper and different firing.

Firing: Regular, high temperatures, initially with a reducing atmosphere and culminated with a rapid exposure of the vessels to an oxidizing atmosphere, producing a layered effect with gray, brown and

beige cores (7.5YR 2.5/1-black, 5YR 3/3-dark reddish brown), and pinkish, purple and orange surfaces (2.5YR 5/4-reddish brown, 2.5YR 5/8-red) in very durable vessels.

Surface treatment: Rough smoothing by the use of an uneven and textured object (textile or maize cob), which left horizontal striations, mostly visible in the surfaces of the vessels' neck and rims.

Forms: Necked jars and necked cooking-pots are common. Bowls, bottles, gourd-shaped bowls, platter, plates/dishes, flat-based bowl, and oversized vessels were also found. Other artifacts: scrapers from reused sherds, miniatures, and "*platos de alfarero*".

Decorative techniques: Cane coarse impressed, coarse rocker stamping, appliqué, coarse point incisions, incisions and mold impressed (i.e coarse and fine "*piel de ganso*"). Casma style decorations are highly present.

Chronological assessment: A.D. 1000-1530, Late Intermediate Period and Late Horizon Period.

Ware V-B (F2)

Paste: The matrix shows a medium to coarse grain texture, moderate porosity, and it is tempered with very coarse (1 – 2mm) and granule (2 – 3mm) size sand, well sorted, and in proportions between 20 and 30%. The temper is crushed quartzite rocks with/or sand of mixed composition with semi-angular quartz and black semi-rounded rocks (probably basalt). Similar to V-A and V-C.

Firing: Irregular, medium temperatures, in an oxidizing atmosphere that produces a wide variety of beige and brown colors with fire clouds in the surface (core: 2.5YR 4/6-red; surface: 2.5 YR 4/4 reddish brown; fire clouds: 2.5 YR 3/1 dark reddish gray).

Surface treatment: Rough smoothing by the use of an uneven and textured object (textile or maize cob), which left horizontal striations, mostly visible in the surfaces of the vessels' neck and rims.

Forms: Necked jars, necked cooking-pots and oversized vessels ("*tinajas*") are common. Bowls, bottles, graters, neckless jars, plates/dishes and flat-based bowl were also found. Other objects: scrapers from reused sherds, disc, miniatures, "*plato de alfarero*", and molds.

Decorative techniques: Coarse cane impressions, coarse rocker stamping, coarse point incisions in patterns (Casma style). Mold impressions (fine and coarse "*piel de ganso*")

Chronological assessment: A.D. 1000-1530, Late Intermediate Period and Late Horizon Period.

Ware V-C (F1)

Paste: The matrix shows a medium to coarse grain texture, moderate porosity, and it is tempered with very coarse (1 – 2mm) and granule (2 – 3mm) size sand, poor sorted, and in proportions higher than 20%.

The temper is crushed quartzite rocks with/or sand of mixed composition with semi-angular quartz and black semi-rounded rocks (probably basalt). Similar to V-A and V-B.

Firing: Regular, medium temperatures, in a reducing atmosphere that produces vessels of moderate hardness and gray tones (core: GLEY1-5/N-gray, GLEY1-6/N-gray; surface: GLEY1-4/N-dark gray, GLEY1-3/N-very dark gray).

Surface treatment: Rough smoothing by the use of an uneven and textured object (textile or maize cob), which left horizontal striations, mostly visible in the surfaces of the vessels' neck and rims.

Forms: Bowls, necked jars and necked cooking-pots are common. Bottles, gourd-shaped bowls, a platter, short necked jar, neckless jar, plates/dishes, flat-based bowls and oversized vessels ("*tinajas*") were also found. Other objects: scrapers from reused sherds,

Decorative techniques: Appliqués, mold and cane impressions, and some specimens show "*paleteado*" (Casma and Chimú styles).

Chronological assessment: A.D. 1000-1530, Late Intermediate Period and Late Horizon Period.

Ware V-D (H)

Paste: The matrix shows a very fine grain texture, very compact and almost without temper. In those specimens in which temper was added it was of fine size (1/8 – 1/4mm) sand and in proportions lower than 5%.

Firing: Regular, high temperature, in a reducing atmosphere that produces durable but sometimes brittle vessels of gray to black tones (core: GLEY1-5/N-gray, surface: GLEY1-2.5/N-black, GLEY1-3/N-very dark gray)

Surface treatment: Very careful smoothing and polishing. Some vessels were blackened by smoking.

Forms: Bowls and bottles (inc. stirrup spout) are common. Necked jars, plates/dishes, a flat-based bowl, and an oversized vessel ("*tinaja*") were also found.

Decorative techniques: Mold impressions and mold shaping of Chimú or Chimú-Inka style. One specimen is a vessel with a black Middle Horizon style of "*cara-gollete*".

Chronological assessment: A.D. 1000-1530, Late Intermediate Period and Late Horizon Period. May be including gray/black wares of the Middle Horizon Period (A.D. 500-1000)

Ware V-E (G)

Paste: The matrix shows a coarse grain texture, moderately compact, and it is tempered with coarse sand (1/2 – 1mm), well sorted, and in proportions between 10 and 20%. The temper is crushed quartzite rocks with sand of mixed composition with semi-angular quartz and black semi-rounded rocks (probably basalt).

Firing: Regular, high and very high temperatures, in an oxidizing atmosphere that produces very durable vessels of pink, purple and orange tones (core and surface: 2.5YR 5/6-red, 2.5YR 6/4 light reddish brown)

Surface treatment: Rough smoothing by the use of an uneven and textured object (textile or maize cob), which left horizontal striations, mostly visible in the surfaces of the vessels' neck and rims.

Forms: Necked jars and necked cooking-pots are common. Bowls, bottles, plates/dishes and flat-based bowl and an oversized vessel ("*tinaja*") were also found. Other objects: scrapers from reused sherds.

Decorative techniques: Coarse cane impressions, coarse rocker stamping, coarse point incision pattern, mold impressed ("*piel de ganso*", and *appliqué*, Casma and/or Chimú style). Painting with white and black pigments (Huari Norteño style)

Chronological assessment: A.D. 800 – 1530, part of Middle Horizon Period, Late Intermediate Period and Late Horizon Period.

Ware V-F (M)

Paste: The matrix shows a very coarse grain texture, moderately compact, tempered by granule size rocks (4mm +), good sorting, and in proportions higher than 30%. The temper is sand screened to get the larger grains, in which a large quantity of large, rounded rocks (basalt) was present.

Firing: Regular, medium temperatures, in an oxidizing atmosphere that produces durable vessels with beige and light brown colors (core: 7.5YR 4/3-brown, 2.5YR 4/6 red, surface: 10R 4/6-red)

Surface treatment: Mostly rough smoothing.

Forms: Oversized vessels ("*Tinajas*", "*botijas*") and necked jars.

Decorative techniques: -

Chronological assessment: A.D. 1000 – post 1530, Late Intermediate Period, Late Horizon Period and Colonial Period.

Ware V-G (U)

Paste: The matrix shows a medium grain texture, very compact, and it is tempered with very coarse sand (1 – 2mm), good sorting, and in proportions between 10 and 20%. The temper is crushed dull black rock with angular, elongated appearance. It may be "*shashal*", a slate-like rock.

Firing: Regular, high temperatures, with an initial reducing atmosphere and a rapid exposure to an oxidizing atmosphere that produces very resistant vessels. The core is gray (GLEY1-6/N-gray, 5B 5/1-bluyish gray) and the surface varies between beige and pink (10YR 7/3-very pale brown, 2.5YR 7/4 light reddish brown).

Surface treatment: Rough smoothing and some specimens are especially rugged. One specimen shows glaze.

Forms: Necked jars and necked cooking-pots.

Decorative techniques: -

Chronological assessment: 1000- post 1530, Late Intermediate Period, Late Horizon Period, and Colonial Period.

Ware V-H (W)

Paste: The matrix shows a very fine grain texture, very compact, and with almost no inclusion. When present the inclusions are very coarse (1 – 2mm) and granules (2 – 4mm) size rocks, bad sorting, and in proportions lower than 5%. They may be natural impurities from the clay source.

Firing: Regular, very high temperature, in an oxidizing atmosphere that produces very durable vessels with bright red and orange tones (core: 10R 5/8-red, 2.5YR 5/4-reddish brown, 2.5YR 4/3-reddish brown; surface: 2.5YR 5/8-red, 2.5YR 4/4-reddish brown)

Surface treatment: Careful and rough smoothing.

Forms: Oversized vessels (*“tinajas”* and *“botijas”*) and necked cooking-pots are common. Bowls, bottles (Chimu Inka style) necked jars (inc. *“aribalo”*), plant-pot, plates/dishes and flat-based bows were also found. Other objects: scrapers from reused sherds

Decorative techniques: Post-fired scratched, mold impressions, and glaze.

Chronological assessment: 1450-post 1530, Late Horizon Period, Colonial Period, and modern times.

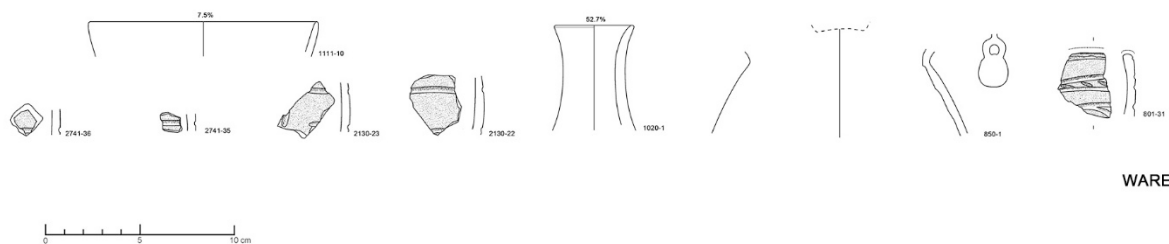
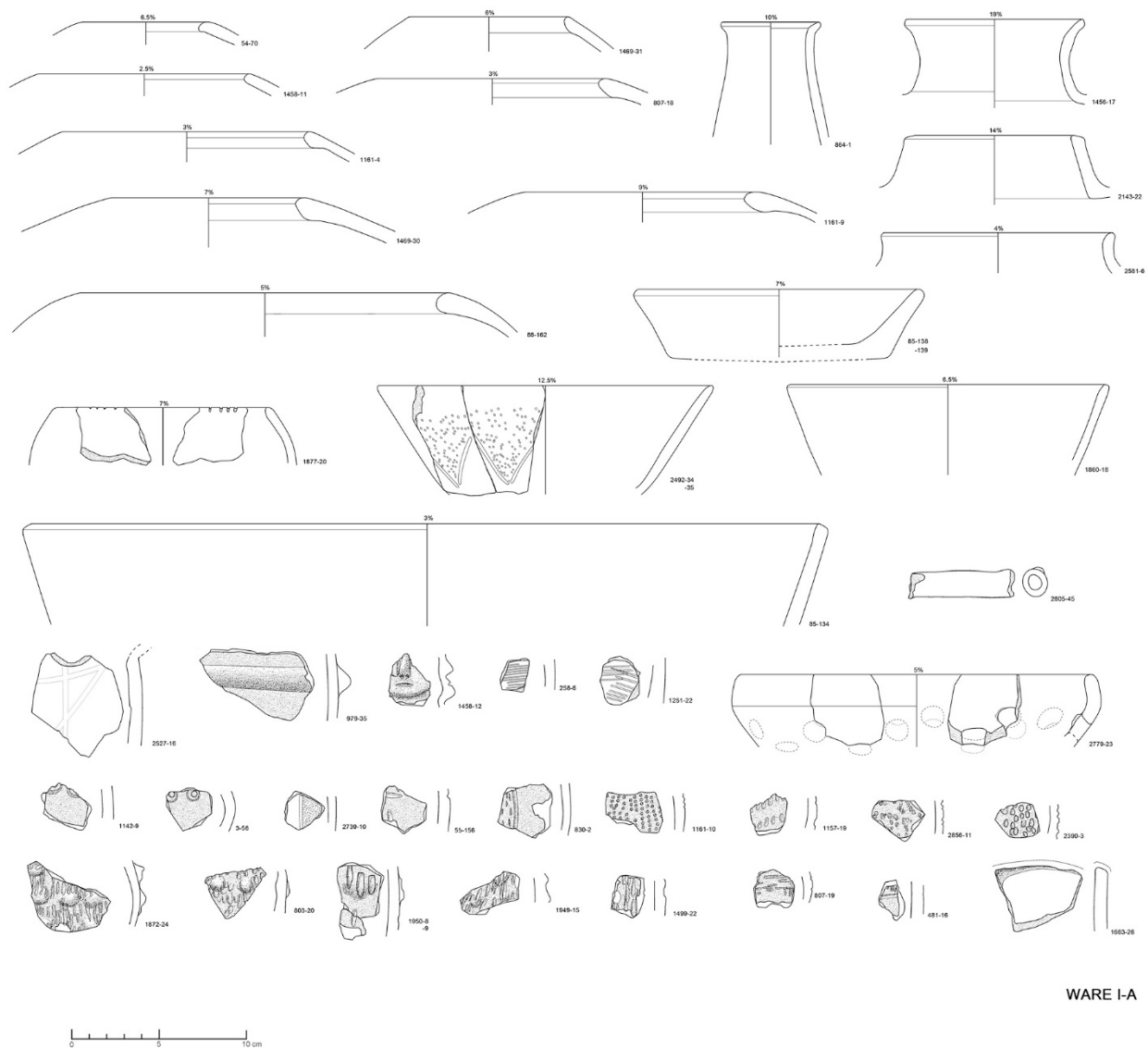


Figure B- 1 Pottery and ceramic artifacts of Ware I-A and Ware I-B.

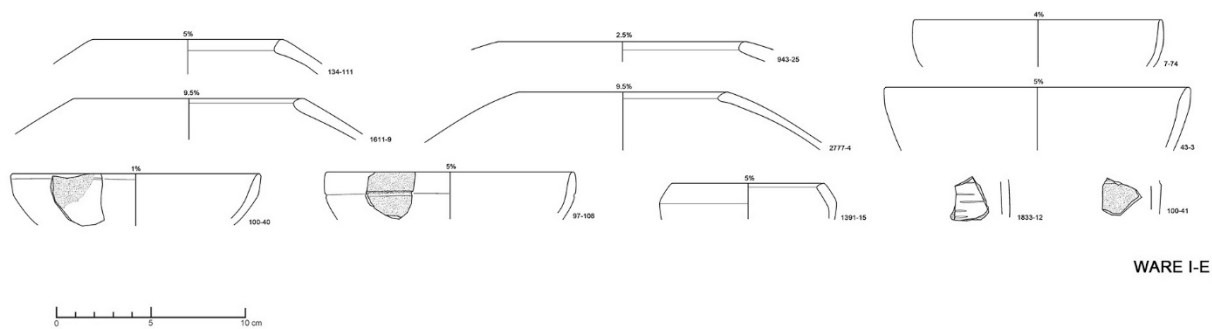
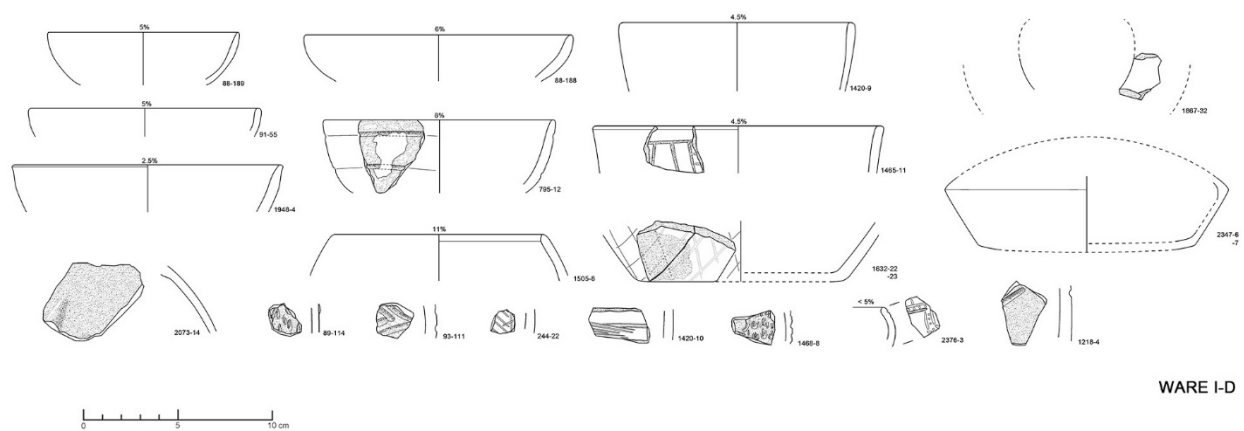
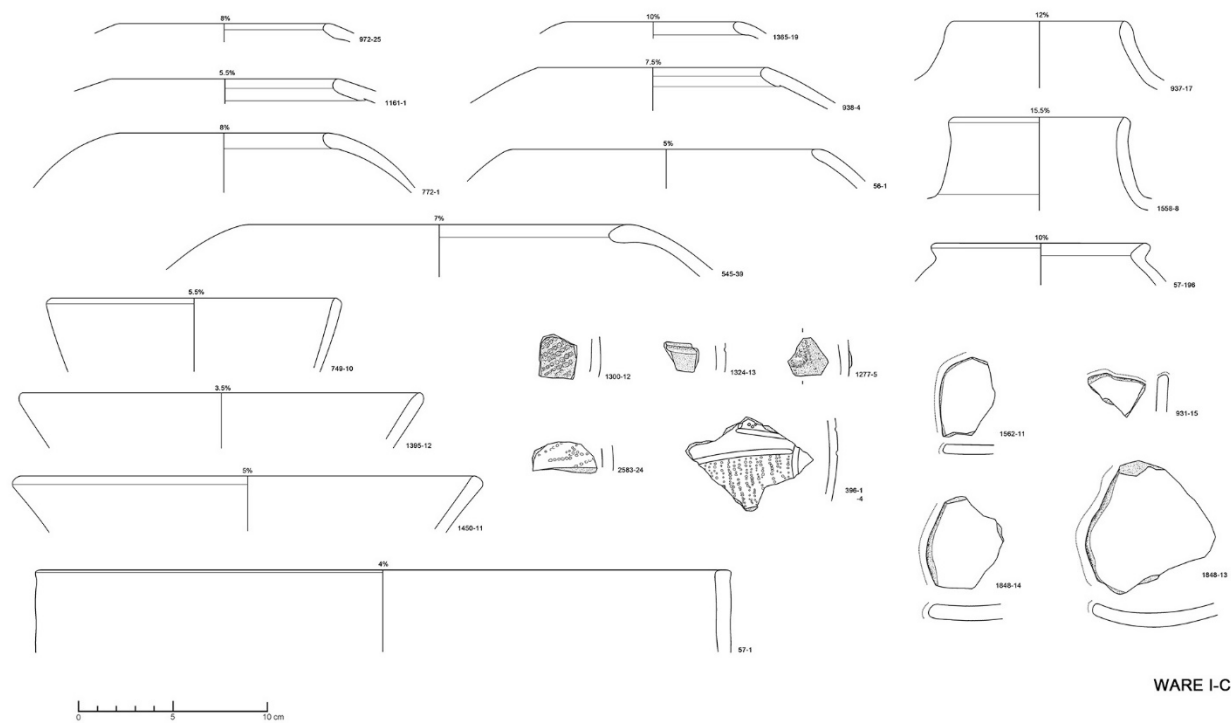
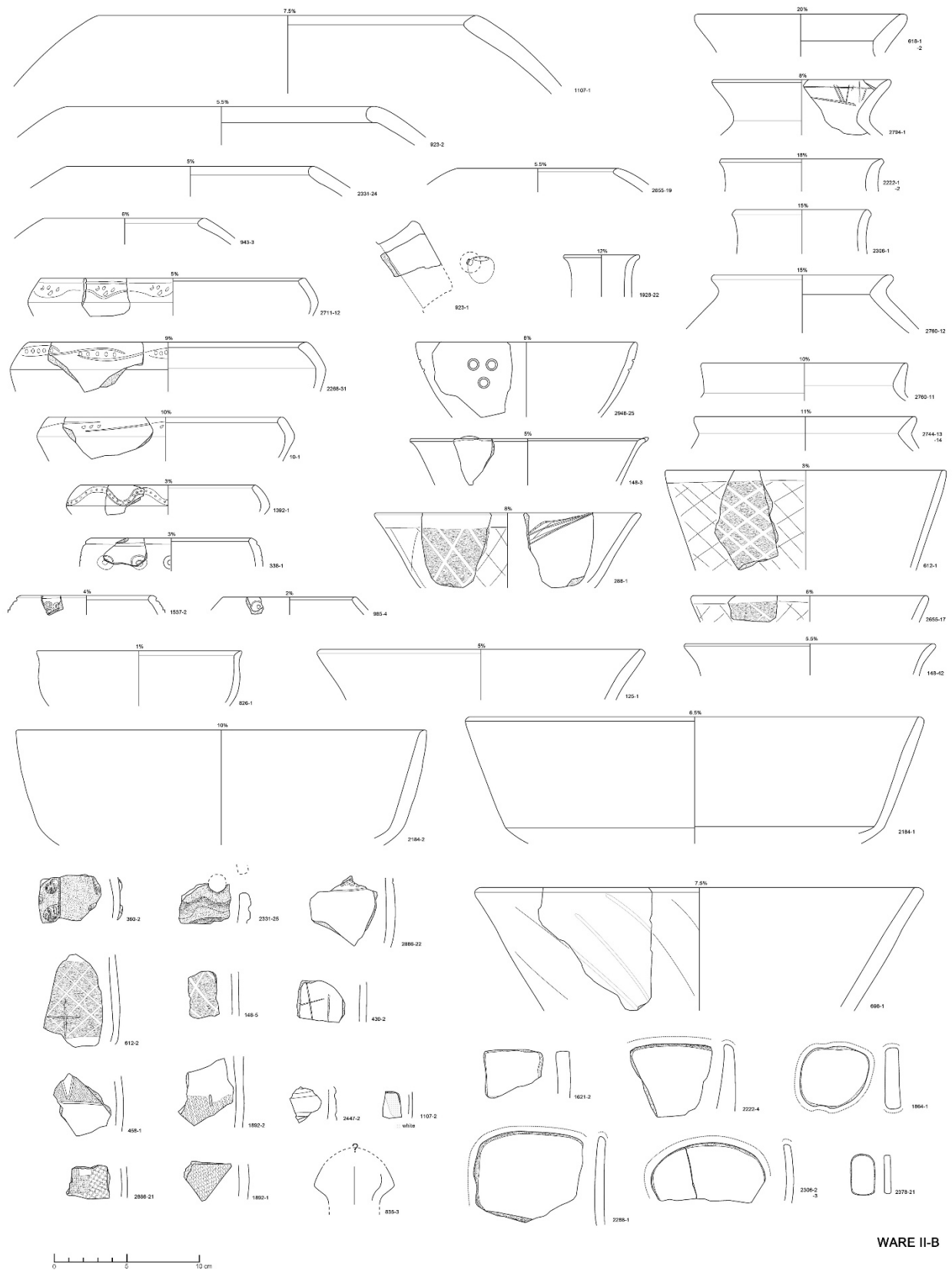


Figure B- 2 Pottery and ceramic artifacts of Ware I-C, Ware I-D and Ware I-E.



WARE II-B

Figure B- 4 Pottery and ceramic artifacts of Ware II-B.

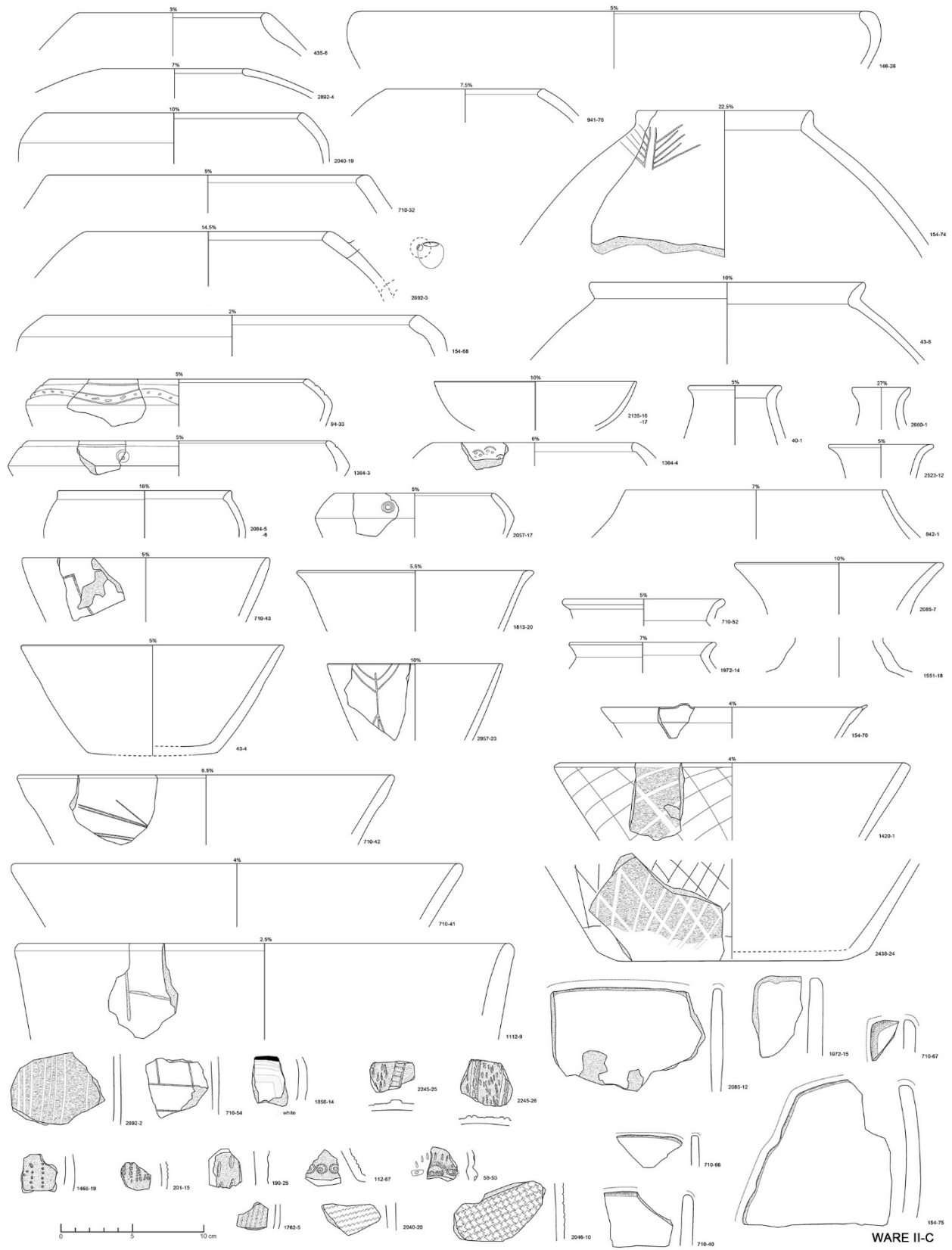


Figure B- 5 Pottery and ceramic artifacts of Ware II-C.

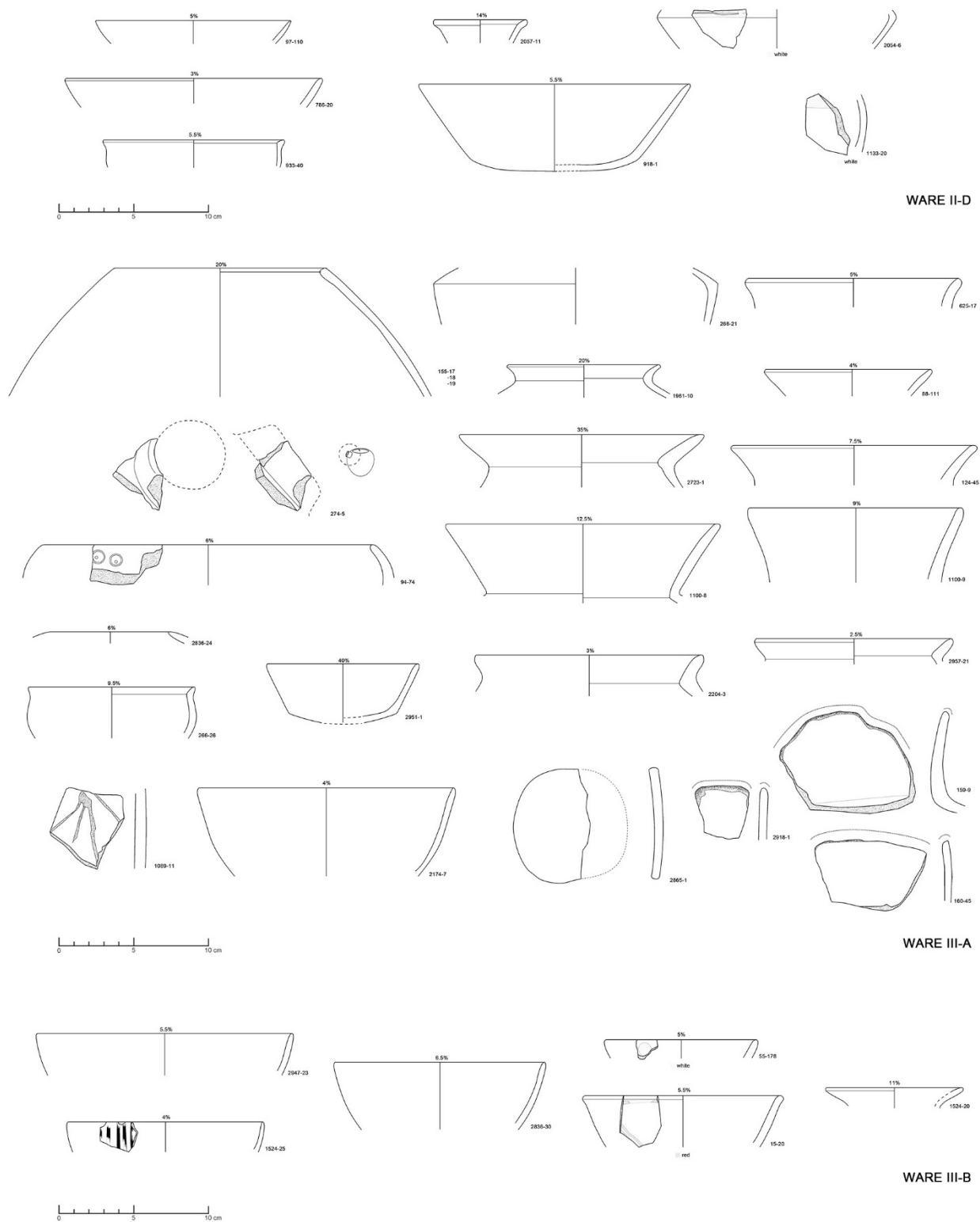


Figure B- 6 Pottery and ceramic artifacts of Ware II-D, Ware III-A and Ware III-B.

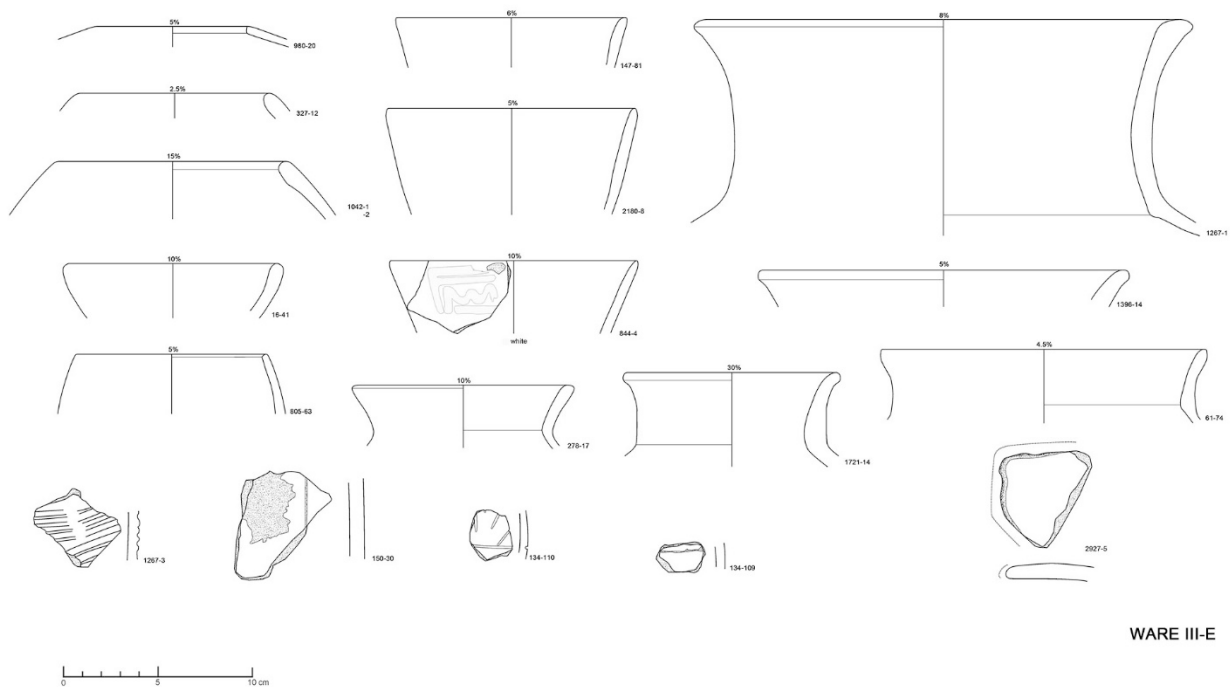
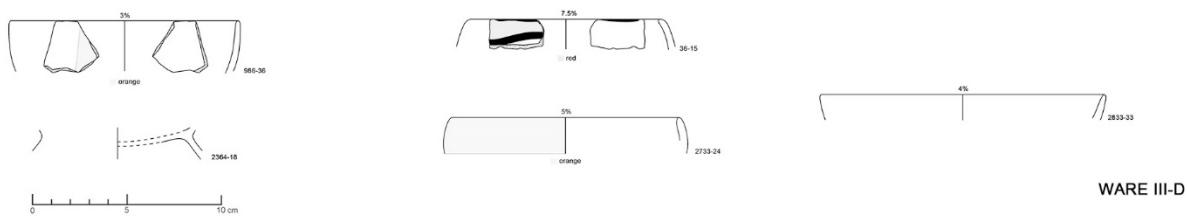
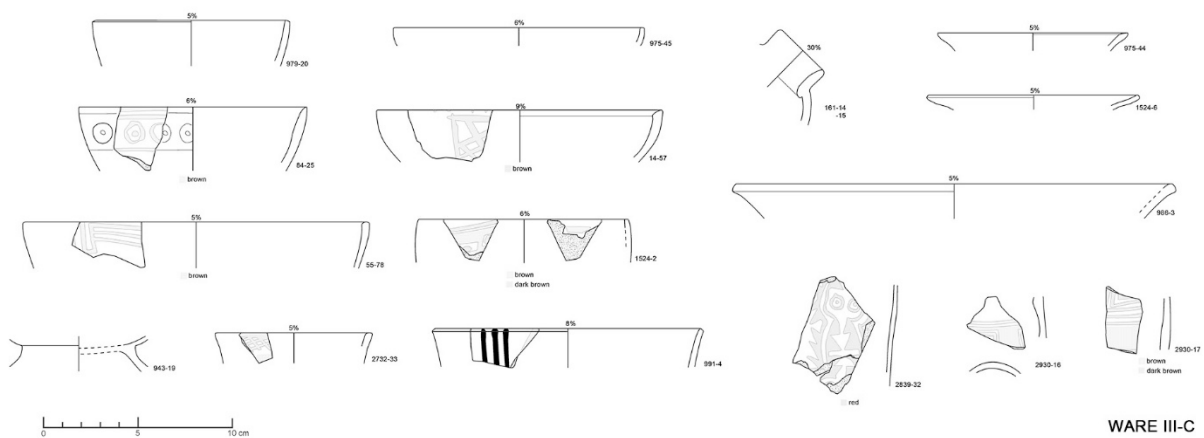


Figure B- 7 Pottery and ceramic artifacts of Ware III-C, Ware III-D and Ware III-E.



Figure B- 9 Pottery and ceramic artifacts of Ware IV-A.

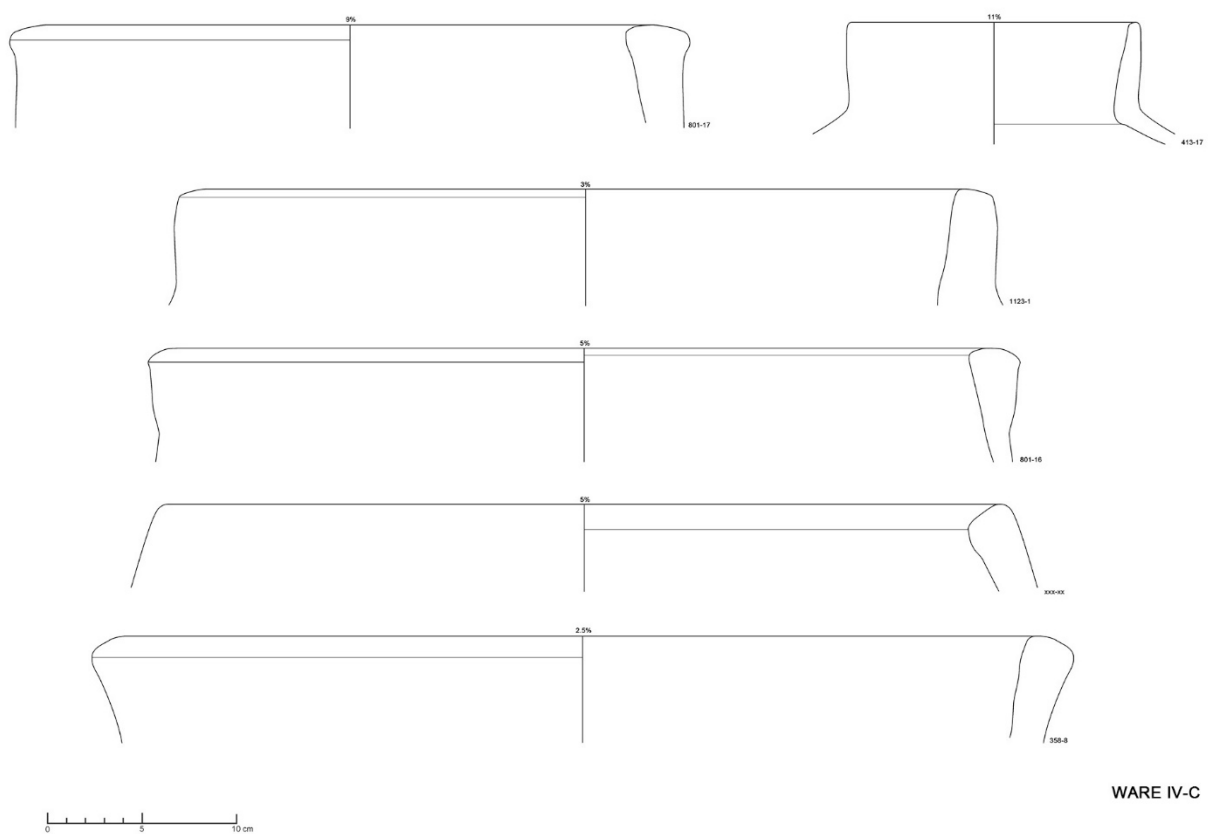
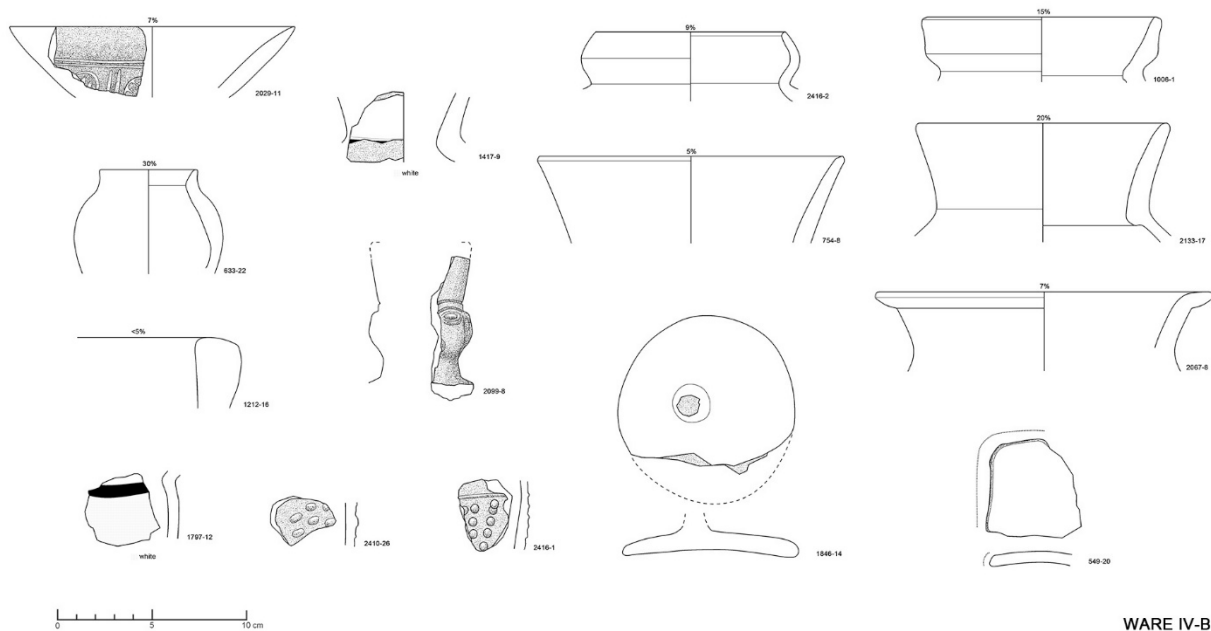


Figure B- 10 Pottery and ceramic artifacts of Ware IV-B and Ware IV-C.

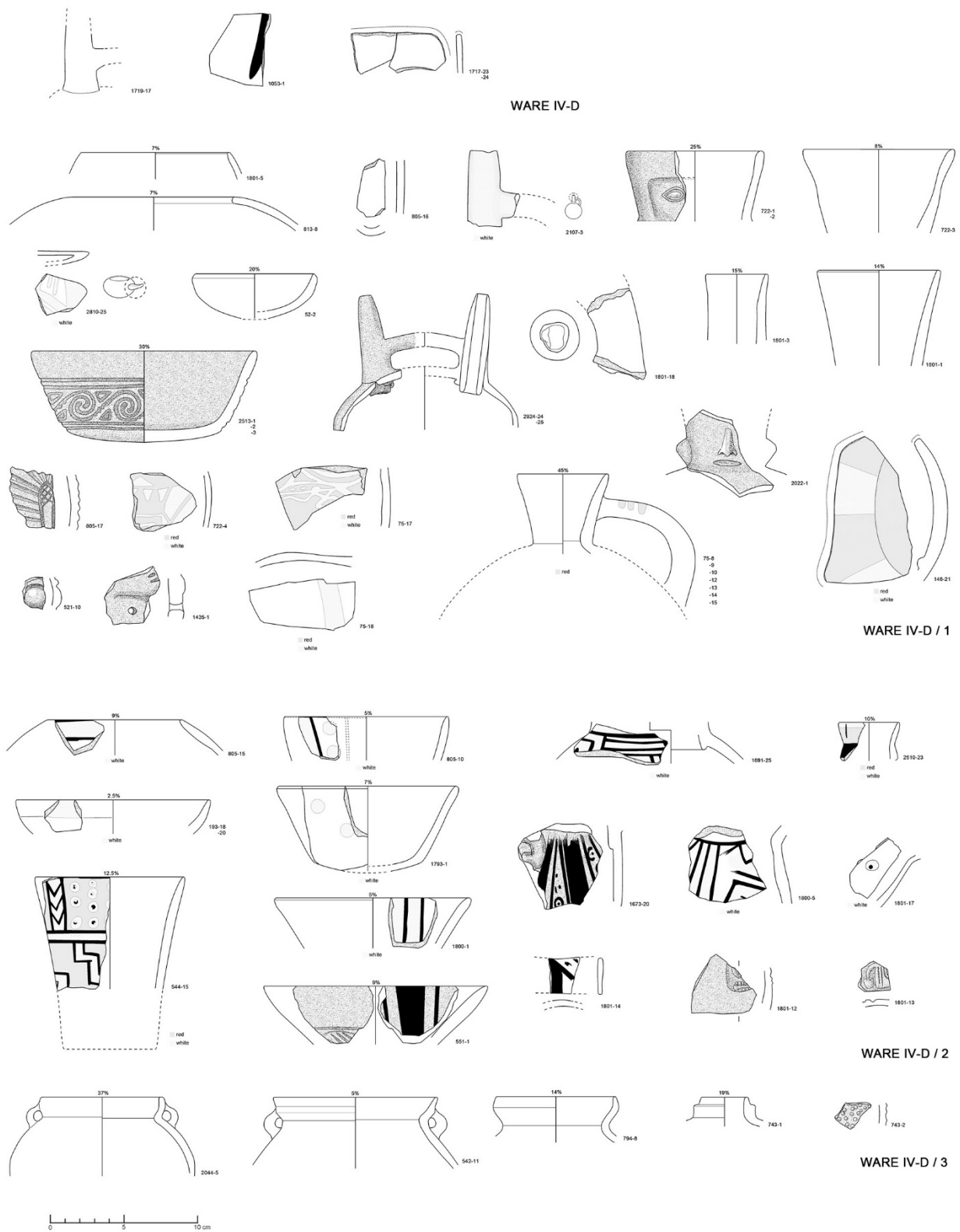


Figure B- 11 Pottery and ceramic artifacts of Ware IV-D.

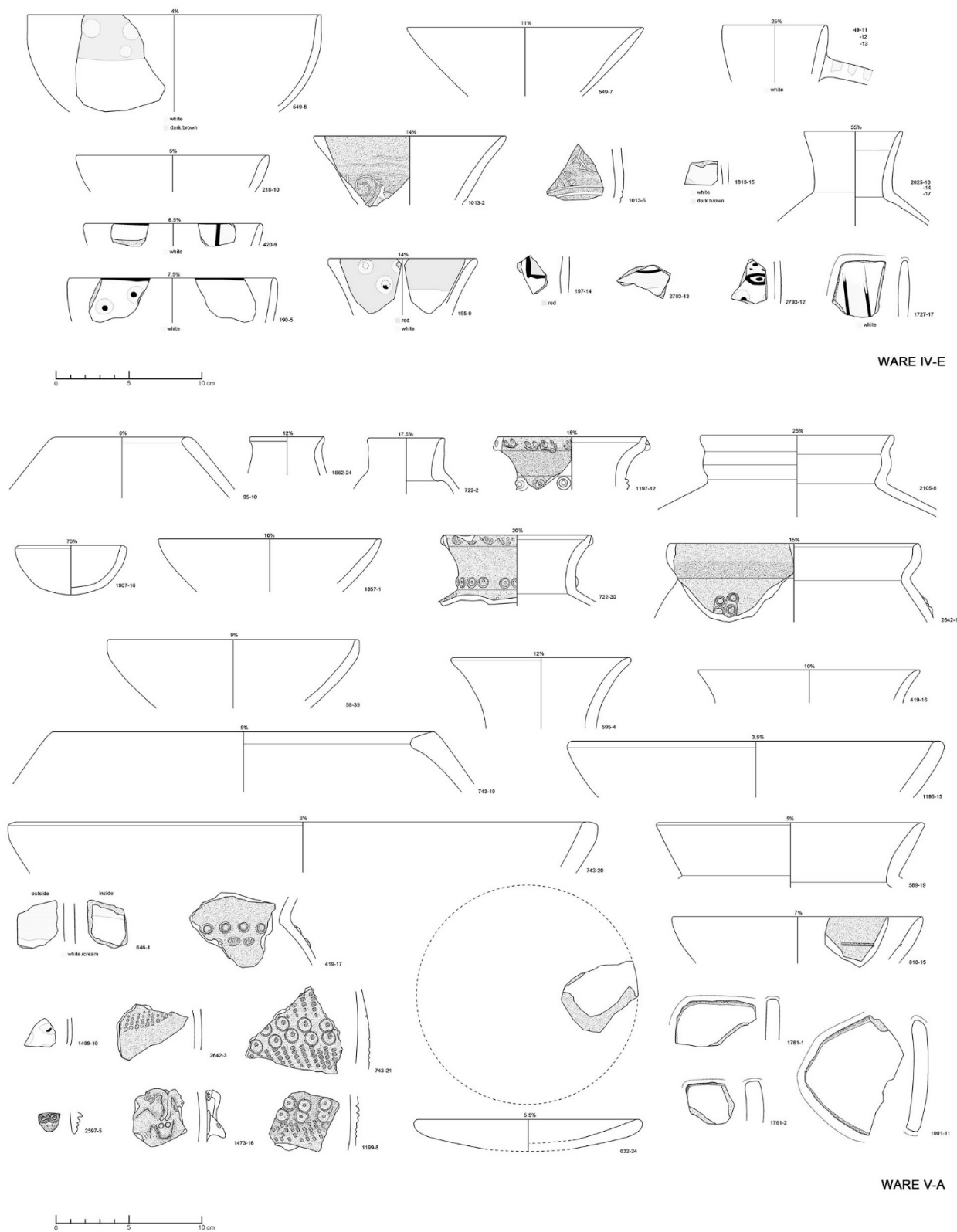


Figure B- 12 Pottery and ceramic artifacts of Ware IV-E, and Ware V-A.

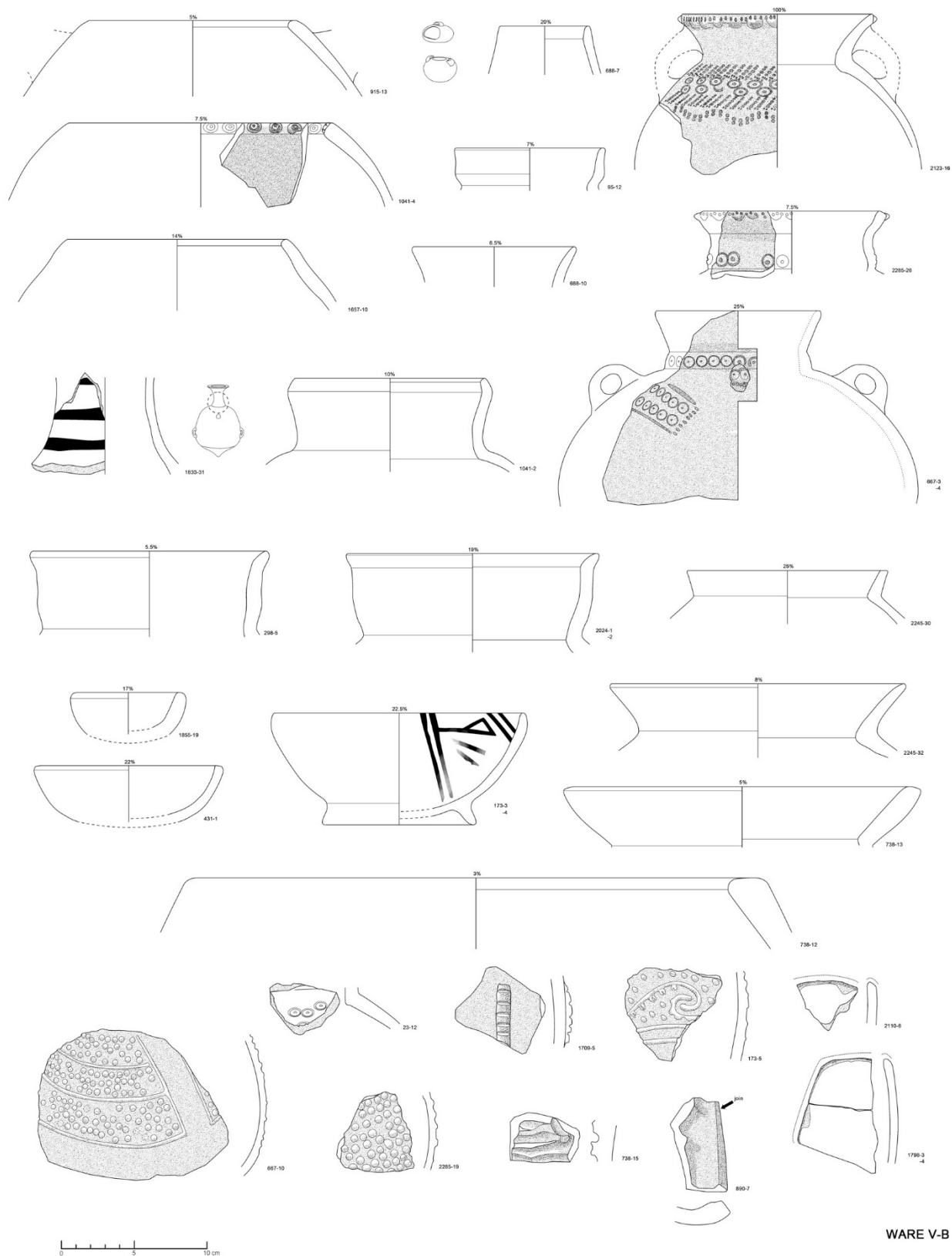


Figure B- 13 Pottery and ceramic artifacts of Ware V-B.

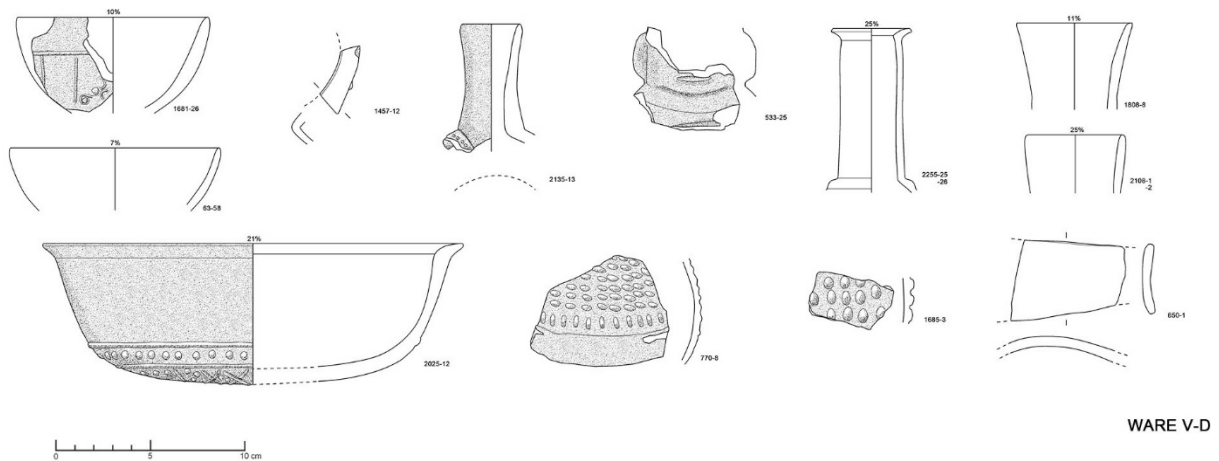
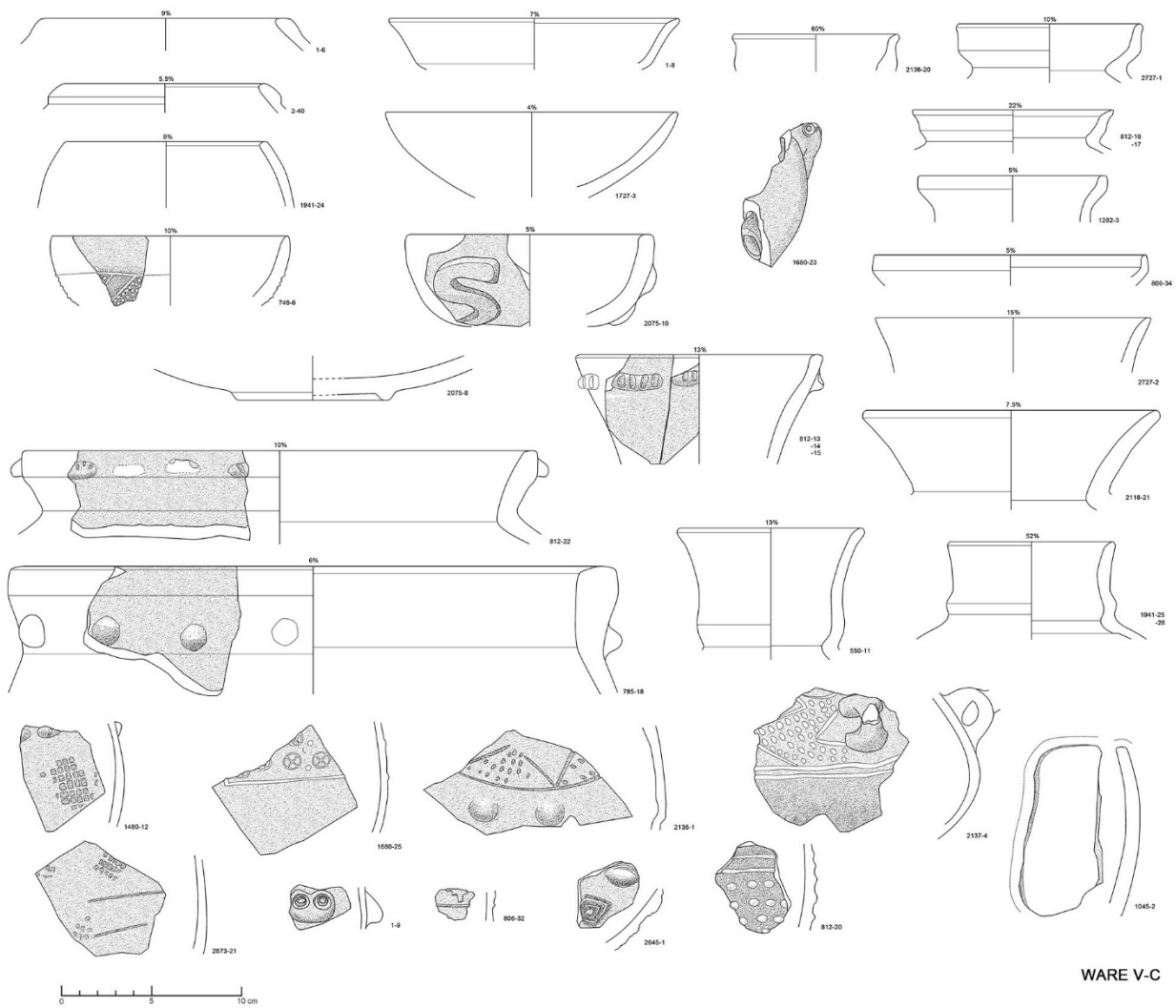


Figure B- 14 Pottery and ceramic artifacts of Ware V-C and Ware V-D.

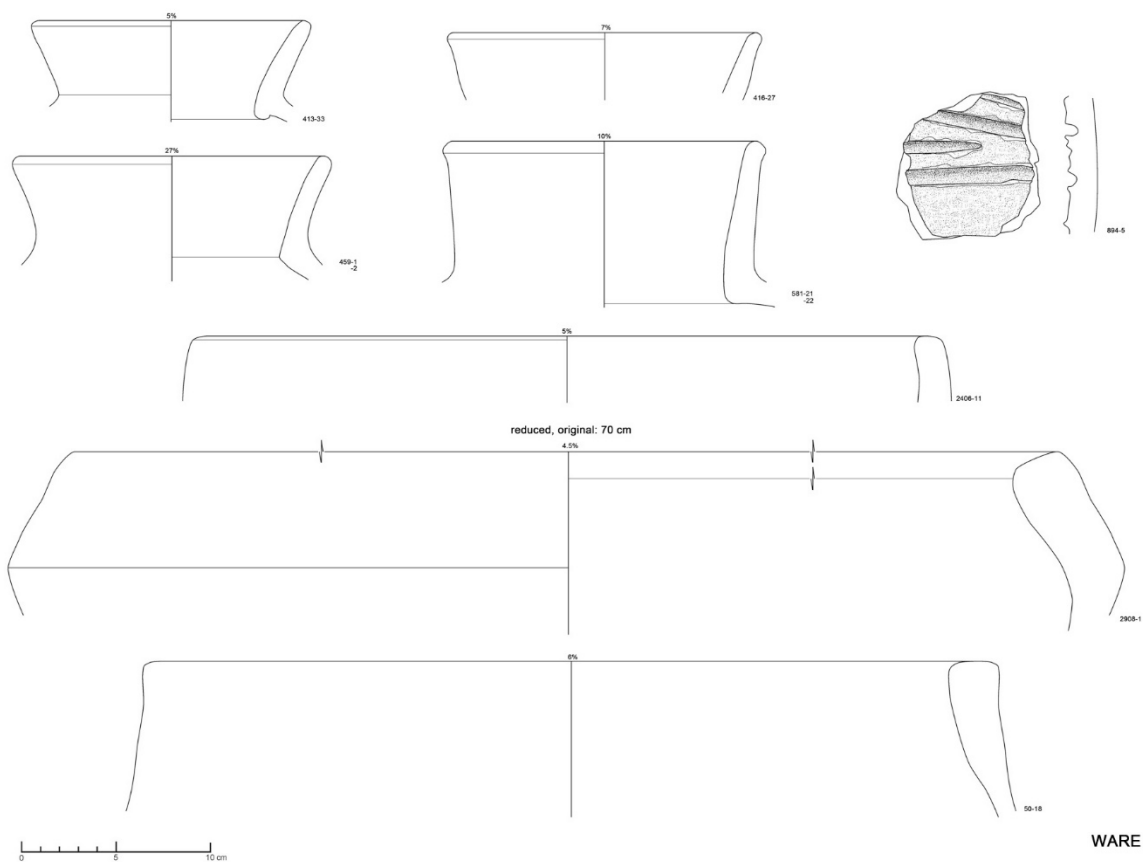
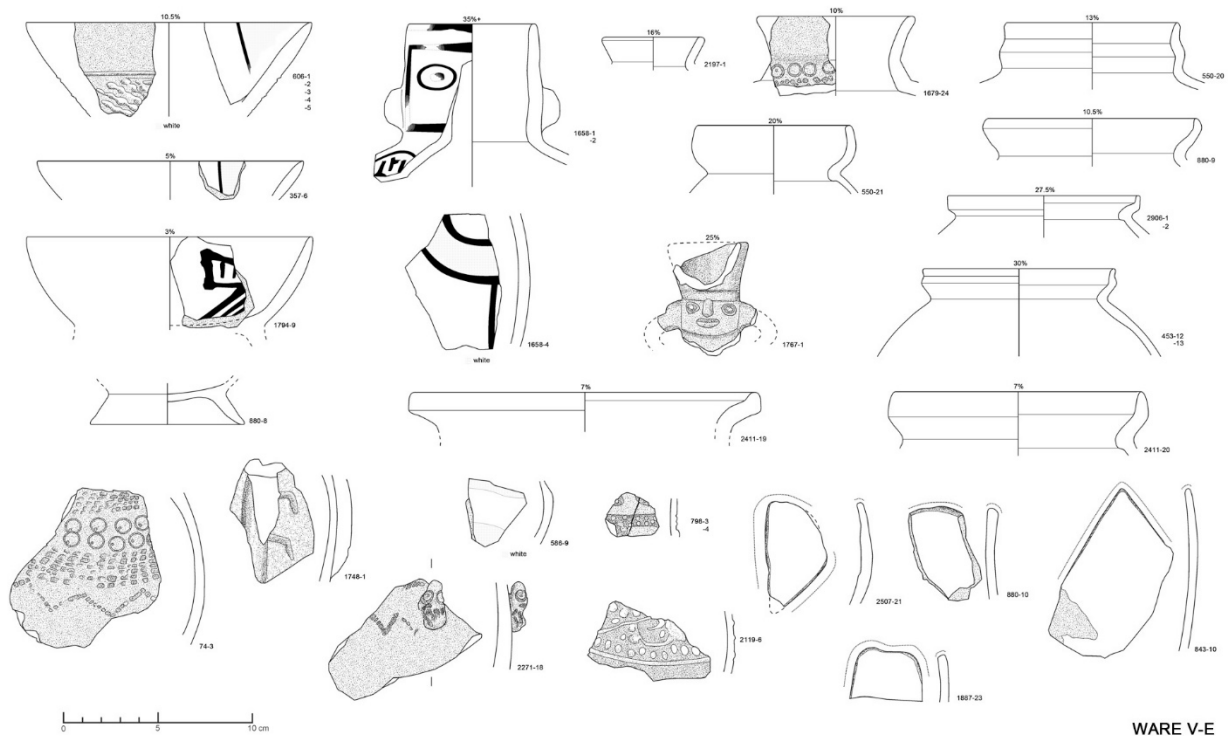


Figure B- 15 Pottery and ceramic artifacts of Ware V-E, and Ware V-F.

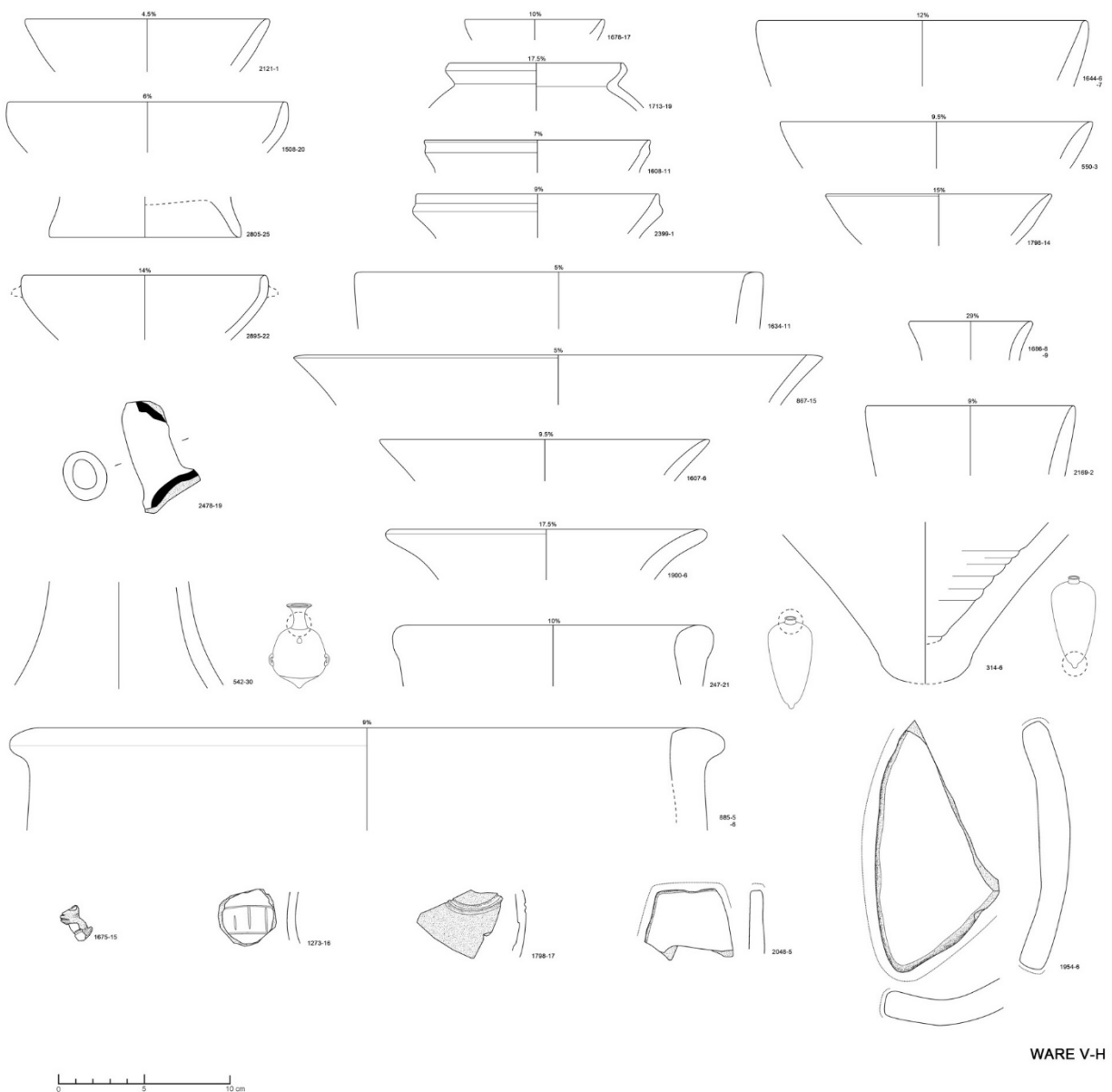
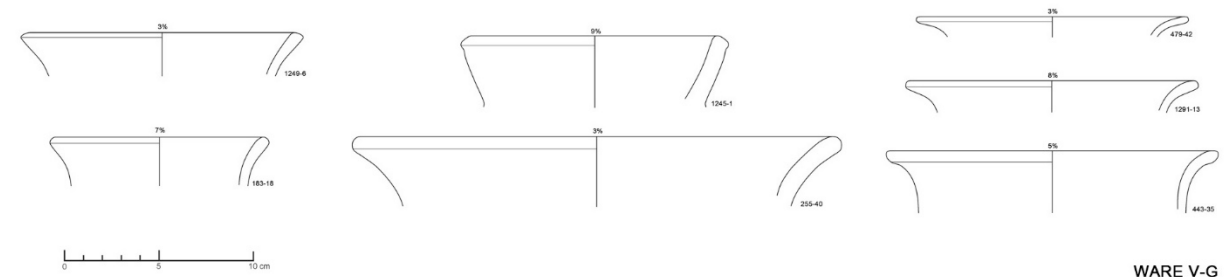


Figure B- 16 Pottery and ceramic artifacts of Ware V-G and Ware V-H.

APPENDIX C

HOUSEHOLD DATABASE FOR ABSOLUTE DEMOGRAPHIC RECONSTRUCTION

The determination of the absolute demographic estimates was based in the relationship between dwellings size and the amount of garbage leave by their occupants. It is assumed that: a) the people who left the garbage was the same than the groups who lived in those buildings, and b) there is a lineal relationship between the number of people and the area of dwellings.

Despite that hundreds of structures were mapped and sketched during the fieldwork, only 16 groups of dwellings were chosen as cases. This selection included structures that can be clearly defined as domestic structures or dwellings, leaving out those structures that may have been used as public spaces or which roofed areas cannot be determined. This last kind includes those cases in which the architecture is not clearly visible, making difficult its recordings, and thus limiting a clear assessment of the dimensions of the domestic space. The determination of the area of rooms are critical because they can be either too small, or too large to be resting places. For instance, those rooms (without internal divisions) larger than 100 m² were not considered as dwellings because it may be difficult to build a structure to support the roof.

This architecture was spatially related with specific survey units. A basic assumption was that the garbage of a group of households can be dispersed up to 50 meters from them (See Appendix A). Consequently the garbage discarded by a group of household are those from a series of adjacent survey units, and not only of the survey units where the structures are located. Those survey units with systematic collections was preferred because garbage densities was directly defined in the field. Only one case (J) with general collection was used considering its clear association with its respective surrounding collections and the spacing between structures in the settlement (see distance with case I).

Table C- 1 Summary of Cases Used in the Analysis

CASE	PERIOD	Survey Units	Type of surface collection
A	II	140, 143	sys
B	II	141, 144	sys
C	II	142	sys
D	II	145	sys
E	II	410, 412	sys
F	III	422, 423, 424	sys/gen
G	II	470, 472, 475	sys/gen
H	II	637, 638	sys/gen
I	II	1055, 1057, 1060	sys/gen
J	II	1058, 1064	gen
K	II	1771, 1772, 1773	sys/gen
L	II	2007, 2034	sys/gen
M	II	2104	sys
N	II	2177	sys
O	II	2250, 2251, 2252, 2253, 2254	sys/gen
P	II	2297, 2298	sys/gen

In some settlements the architecture was only partially recorded, and consequently total roofed area was extrapolated considering the existence of both roofed and open spaces in the estimation:

Table C- 2 Estimates of Roofed Area of Dwellings in Each Case

CASE	Total Area (m2)	Area where structures were recorded (m2)	Percentage of area with recorded architecture	Recorded roofed area (m2)	Extrapolated roofed area for the total area of occupation
A	15750	12106	0.77	184.4	239.9
B	13557	10654	0.79	500.6	637.0
C	10323	8843	0.86	264.4	308.7
D	10563	5473	0.52	159.4	307.6
E	7317.4	7317.4	1.00	28.2	28.2
F	24973	18749	0.75	225.8	300.8
G	3459	3459	1.00	17.6	17.6
H	12475	12474	1.00	59.6	59.6
I	16588	16588	1.00	21.83	21.8
J	7611	7611	1.00	7.9	7.9
K	10838	10838	1.00	70.3	70.3
L	13368	11505	0.86	73.4	85.3
M	2190	2190	1.00	16.9	16.9
N	4571	3572	0.78	26.6	34.0
O	9871	9871	1.00	16.32	16.3
P	12504	7004	0.56	49.9	89.1

In most of the cases, it was clear that the small rooms were resting areas while most of the activities were carried out in the exterior of the rooms, in open space or patios. Grinding stones have been found outside these structures and in open spaces where it can be used by several households.

After the review of an extensive bibliography, Peterson (2006:71-73) reaches the conclusion that typical ratios between roofed space and occupants vary between 4 to 6 m² per person. Then, after leaving out those structures with roofed area smaller than 4 m² (which is not very likely to be residences), a minimum population estimate was reached using the ratio of 6 m² per person for the total roofed area of a group of households in a settlement. The maximum population estimate was reached using the ratio of 4 m² per person.

Table C- 3 Occupants Estimates for Each Case

CASE	Extrapolated roofed area for the total area of occupation	Minimum Population Estimate	Maximum Population Estimate	Total DAI/century	Ratio Min. Pop. / (DAI/century)	Ratio Max. Pop. / (DAI/century)
A	239.9	40	60	2.421	16.52	24.77
B	637.0	106	159	16.453	6.45	9.68
C	308.7	51	77	6.618	7.77	11.66
D	307.6	51	77	10	5.13	7.69
E	28.2	5	7	5.391	0.87	1.31
F	300.8	50	75	4.724	10.61	15.92
G	17.6	3	4	0.743	3.95	5.92
H	59.6	10	15	2.245	4.43	6.64
I	21.8	4	5	0.24	15.16	22.74
J	7.9	1	2	0.1488	8.85	13.27
K	70.3	12	18	1.167	10.04	15.06
L	85.3	14	21	1.53	9.29	13.94
M	16.9	3	4	1.022	2.76	4.13
N	34.0	6	9	1.524	3.72	5.58
O	16.3	3	4	0.861	3.16	4.74
P	89.1	15	22	1.188	12.50	18.75

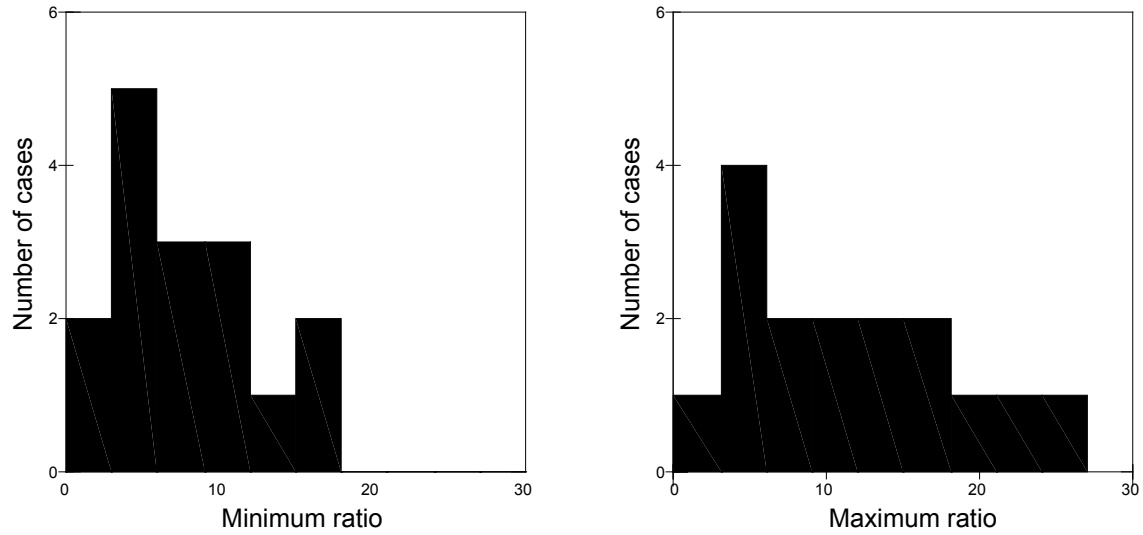


Figure C- 1 Histograms of the value of ratios between dwelling roofed areas and population estimates

The histograms of the value of the ratios Figure C- 1 shows a skewed distribution, and consequently it was decided to use the 10% trimmed mean to obtain the following relationship:

$$\text{Pop_min (A)} = 7.158 \times (\text{DAI/century})$$

$$\text{Pop_max (A)} = 10.737 \times (\text{DAI/century})$$

$$\text{Pop_avg (A)} = 8.948 \times (\text{DAI/century})$$

However, the previous equations consider 100% of continuous occupancy. Let's say that only 75% of the structures were used at the same time, or only the 75% of the time, then the following relationships apply:

$$\text{Pop_min (B)} = 5.369 \times (\text{DAI/century})$$

$$\text{Pop_max (B)} = 8.053 \times (\text{DAI/century})$$

$$\text{Pop_avg (B)} = 6.711 \times (\text{DAI/century})$$

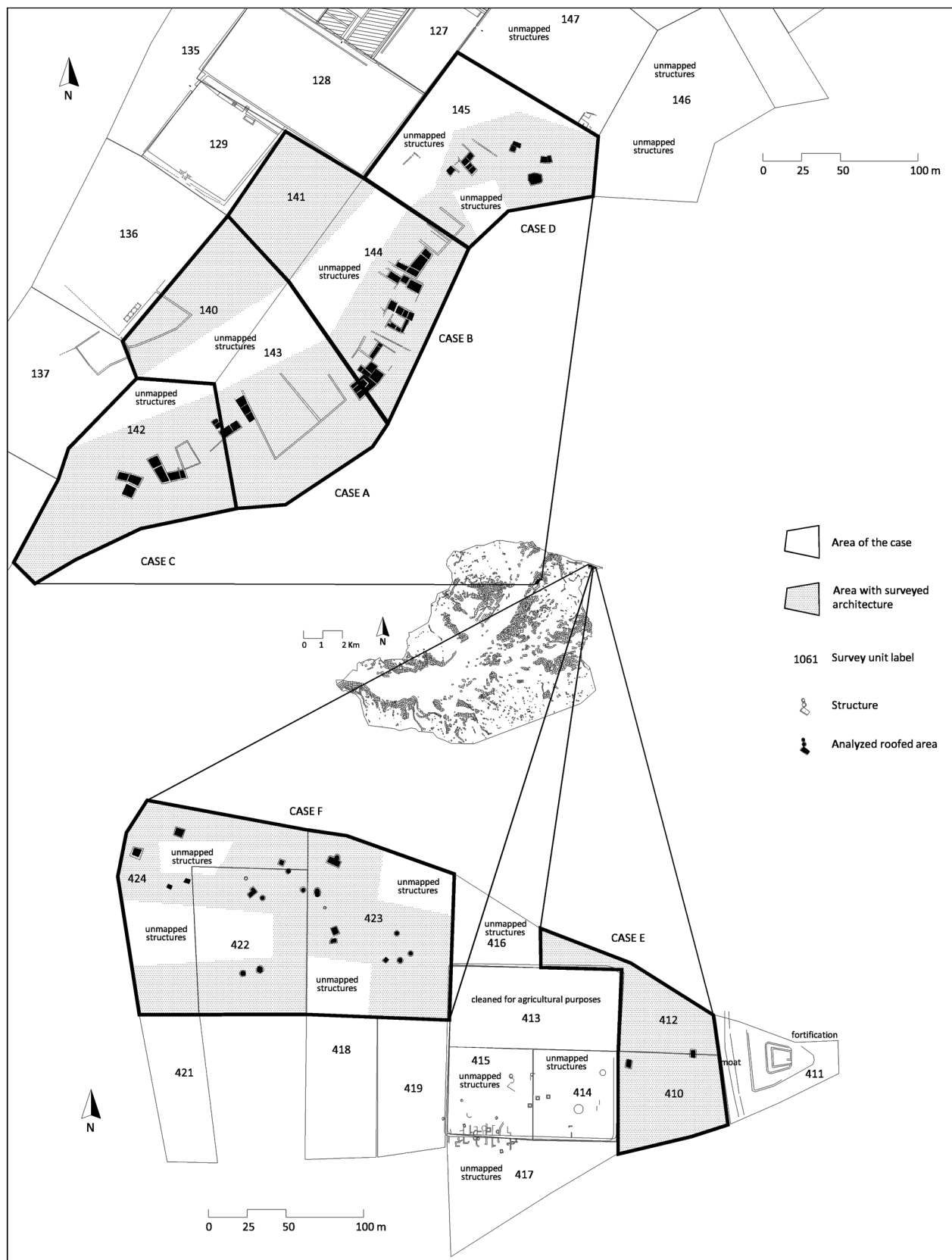


Figure C- 2 Map of cases A to F.

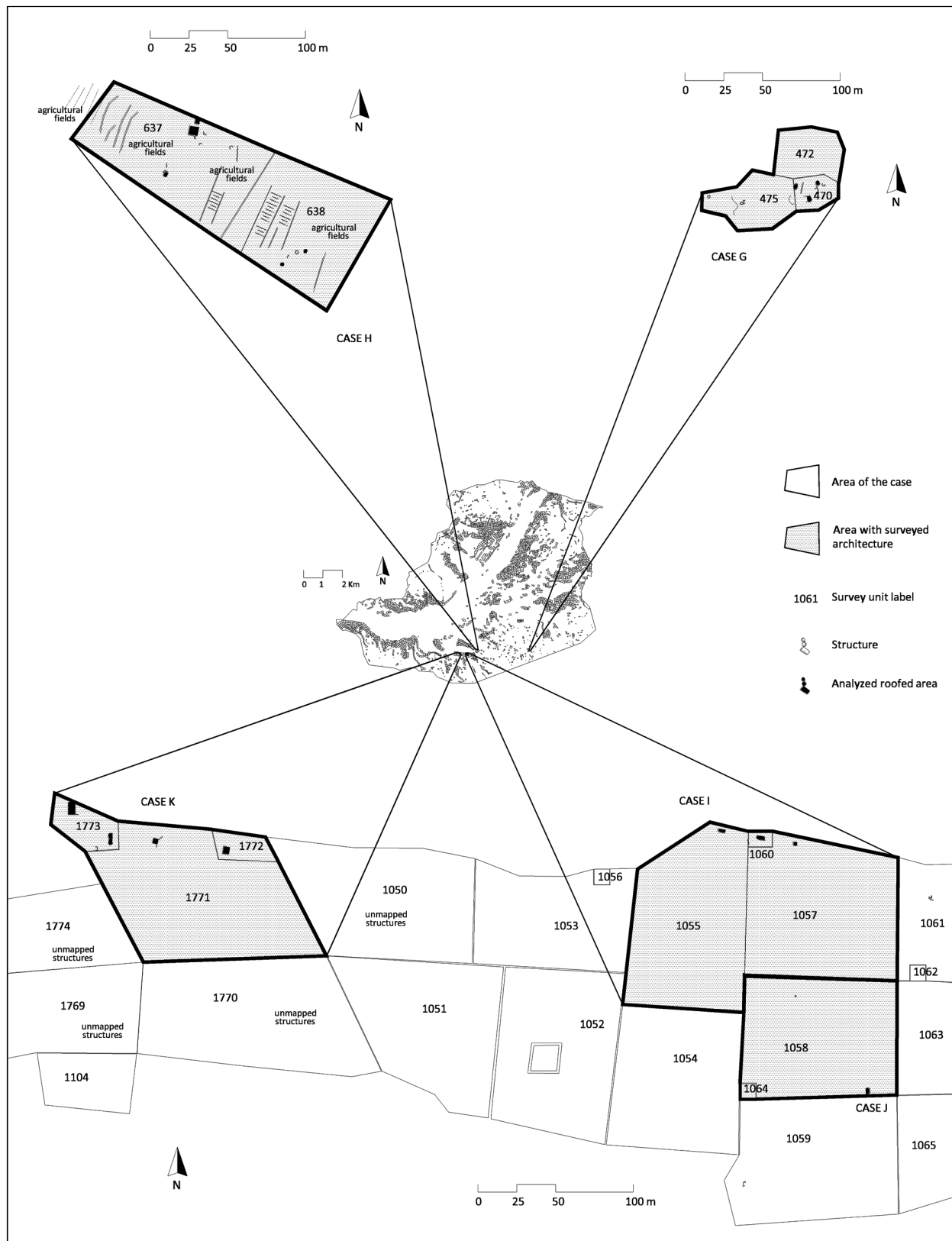


Figure C- 3 Map of cases G to K.

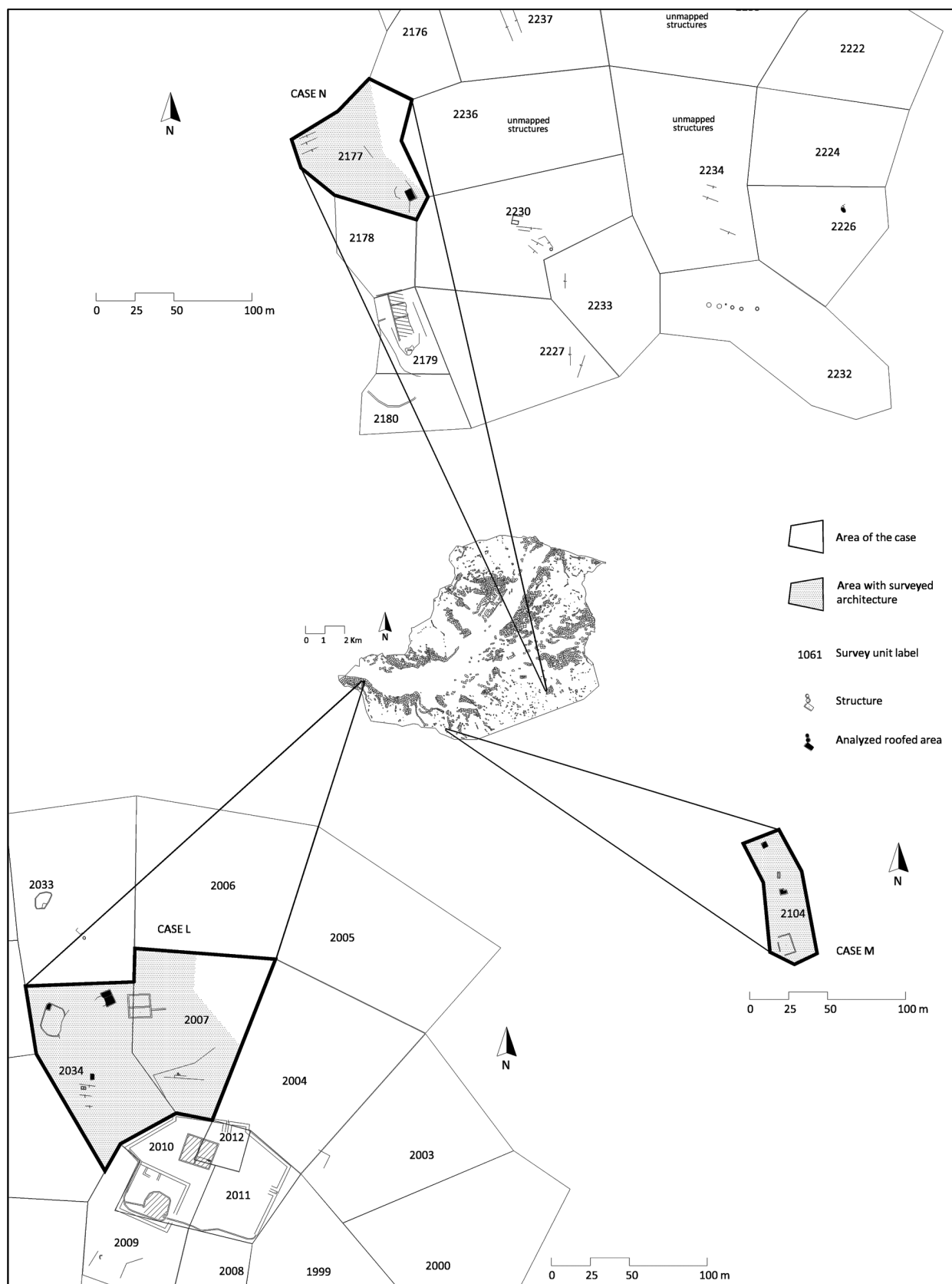


Figure C- 4 Map of cases L to N.

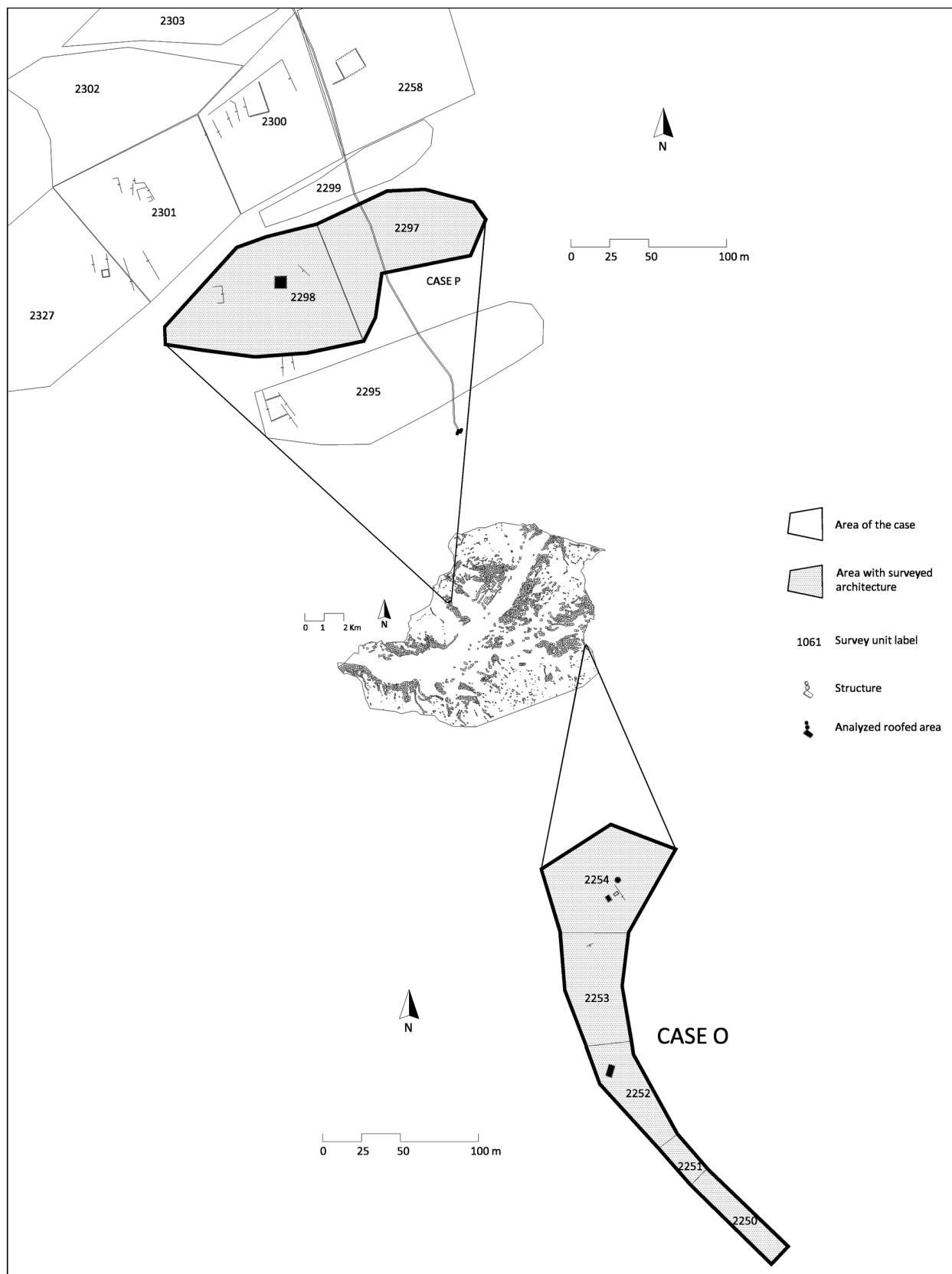
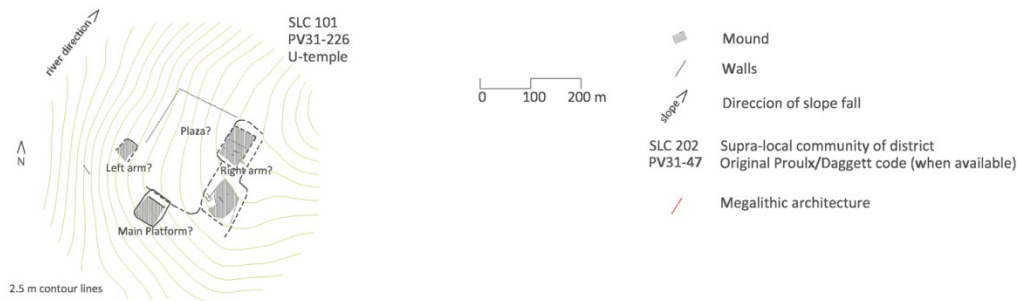


Figure C- 5 Map of the cases O and P.

APPENDIX D

CEREMONIAL CENTERS PLANS AND PHOTOS

Period I (800-450 B.C.)



Transition Period I --> Period II or early part of Period II -Unfinished buildings-

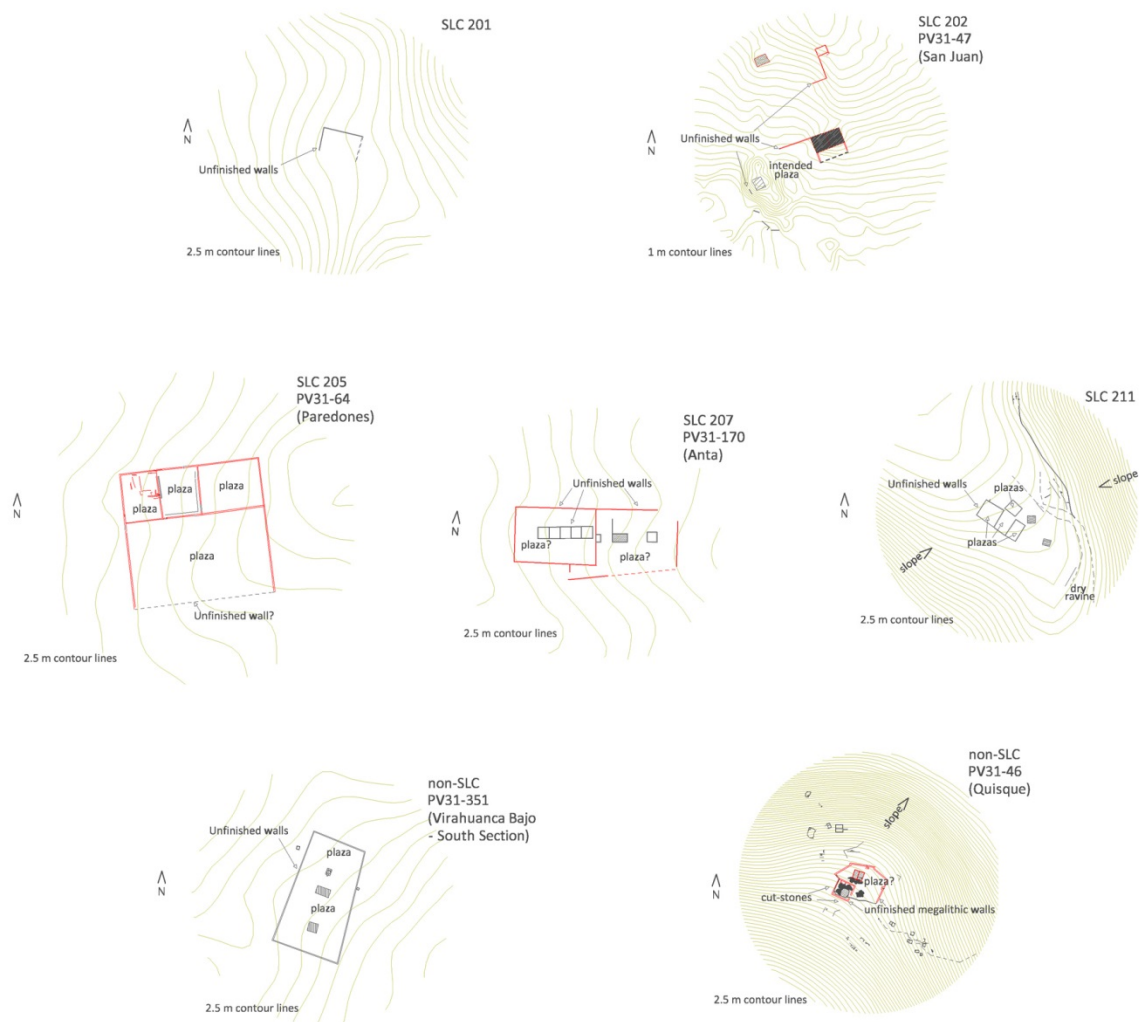


Figure D- 1 Plans of the ceremonial centers of the Period I and Period I/II.

Period II (450-150 B.C.)

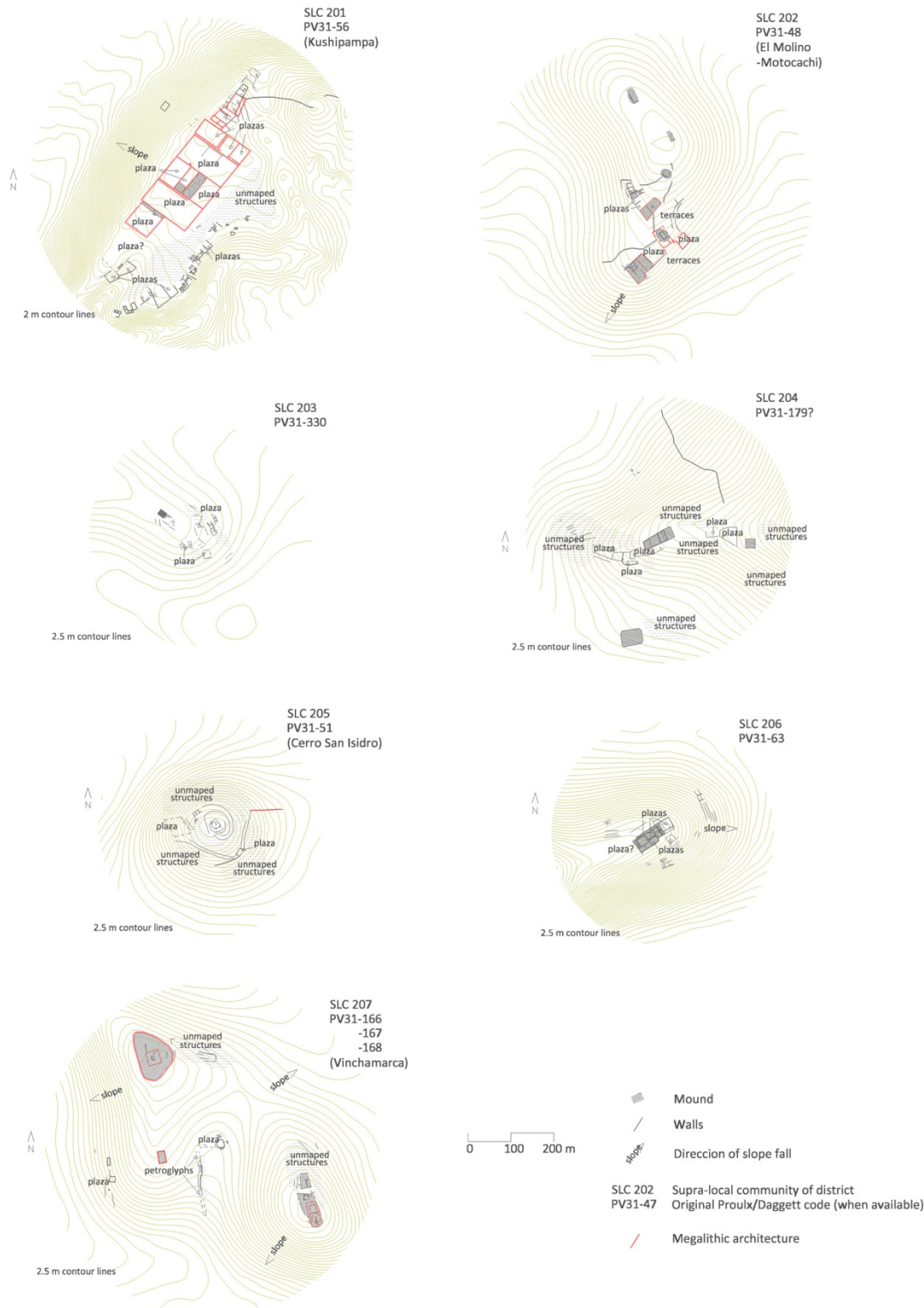


Figure D- 2 Plans of the ceremonial centers of the Period II.

Period II (450-150 B.C.)
(cont.)

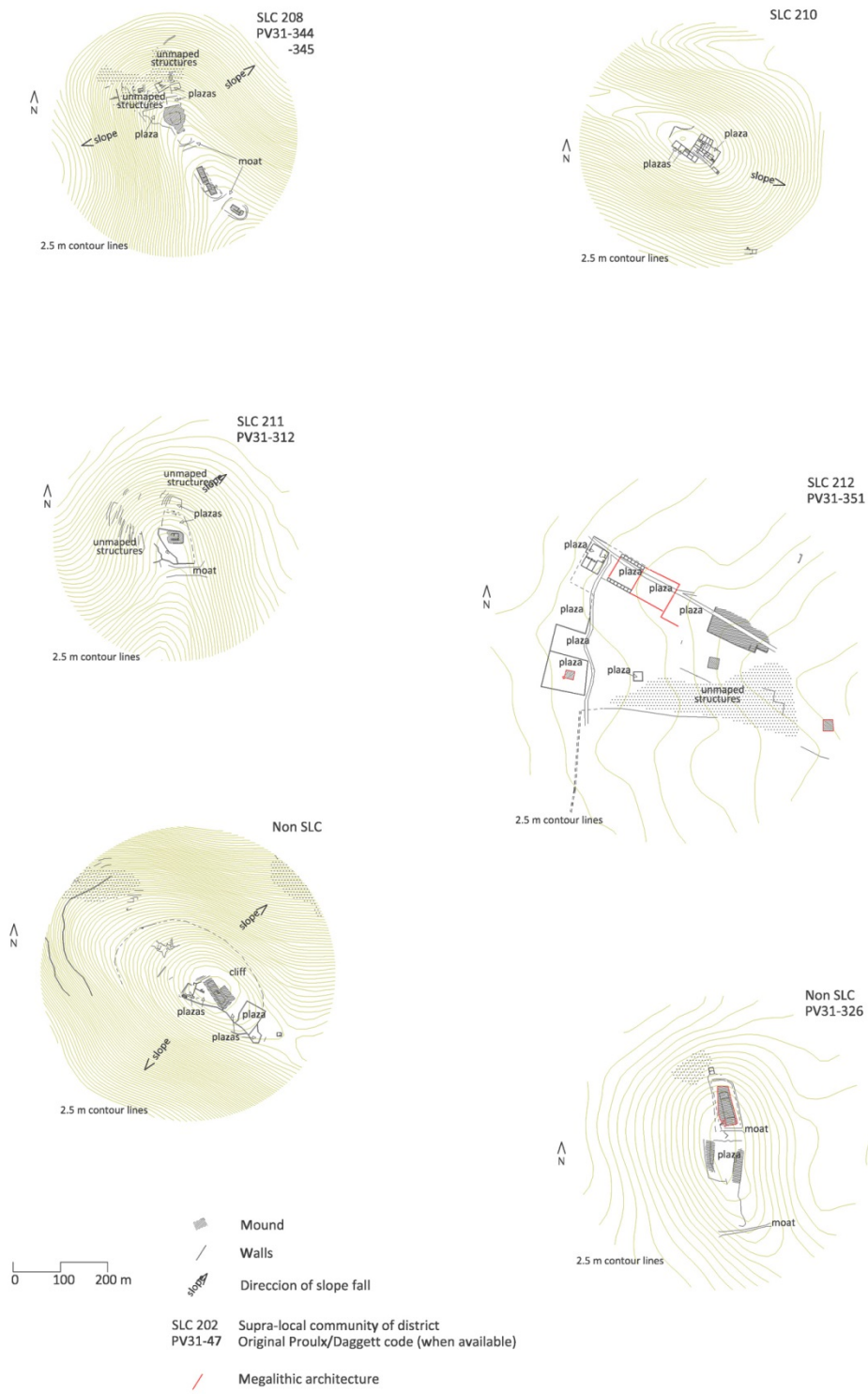


Figure D- 3 Plans of the ceremonial centers of the Period II (cont.)

Period III (150 B.C.- A.D.500)

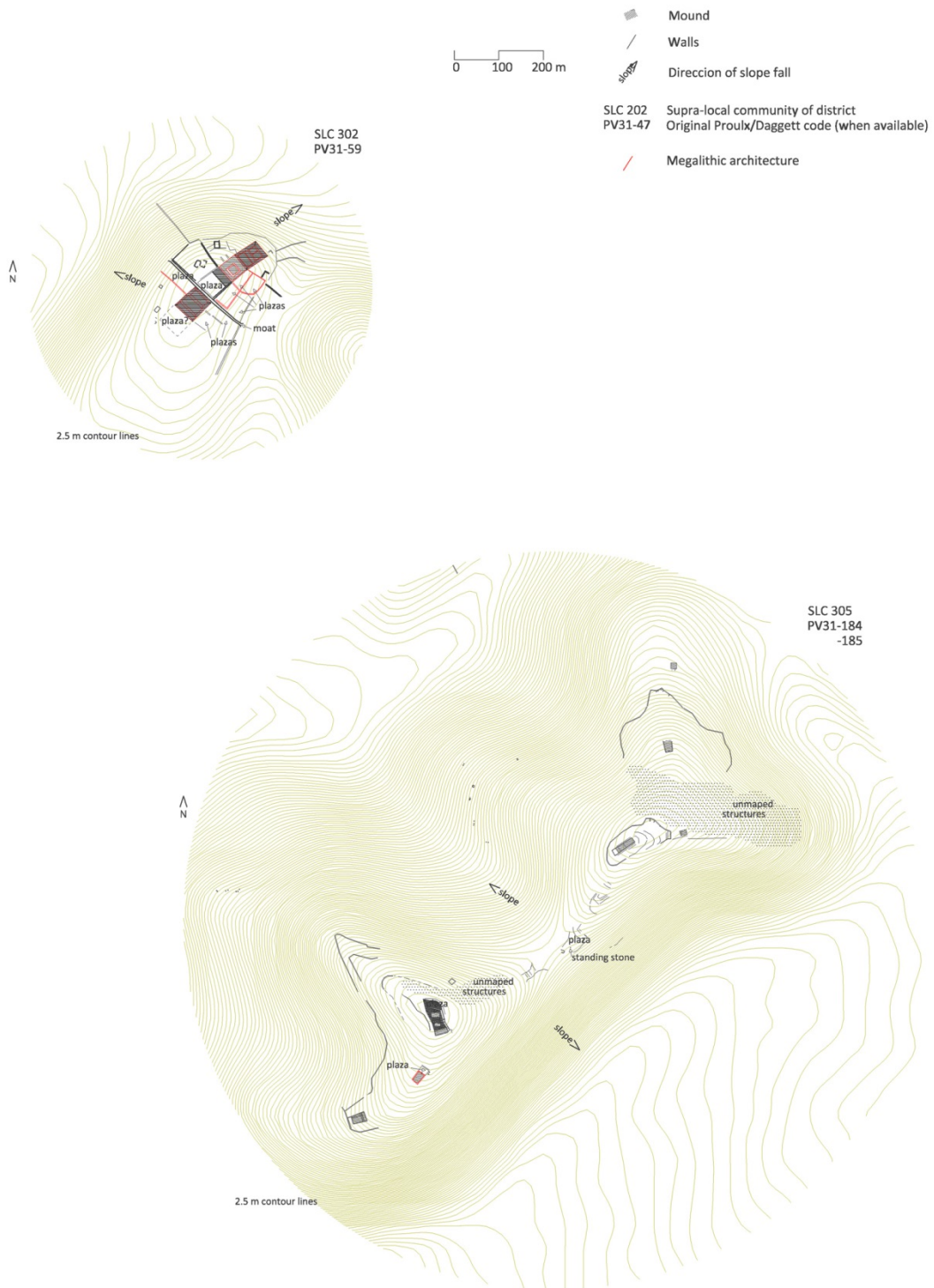


Figure D- 4 Plans of the ceremonial centers of the Period III.



Period I, SLC 101, Nuevo Moro 4 (PV31-226)



Period I/I, SLC 202, San Juan (PV31-47)



Period I/II, SLC 205, Paredones (PV31-64)

Figure D- 5 Photographs of ceremonial centers of Nuevo Moro 4, San Juan and Paredones.



Period I/II, SLC 207, Anta (PV31-170)



Period I/II, SLC 211, Quisque Bajo



Period I/II, non-SLC, Virahuanca Bajo South (PV31-351)

Figure D- 6 Photographs of ceremonial centers of Anta, Quisque Bajo and Virahuanca Bajo South.



Period I/I, Non-SLC, Complejo Quisque (PV31-46)



Period II, SLC 201, Kushipampa (PV31-56, "Siete Huacas")



Kushipampa: reconstruction of the eastern megalithic entrance (left) and detail of the cornerstone (right)

Figure D- 7 Photographs of ceremonial centers of fortress in Complejo Quisque, Kushipampa and architectural details of Kushipampa.



Period II, SLC 202, El Molino-Motocachi (PV31-48)



Period II, SLC 204, Chacuas Cucho 5 (PV31-179)



Period II, SLC 205, Cerro San Isidro (PV31-51)

Figure D- 8 Photographs of ceremonial centers of El Molino-Motocachi, Chacuas Cucho 5 and Cerro San Isidro.



Period II, SLC 206, Cerro Motocahi 8 (PV31-63)



Period II, SLC 207, Vinchamarca (PV31-166/168)



Period II, SLC 208, Virahuanca Cerro (PV31-344/345)

Figure D- 9 Photographs of ceremonial centers of Cerro Motocahi 8, Vinchamarca and Virahuanca Cerro.



Period II, SLC 212, Virahuanca Bajo North (PV31-351)



Period II, non-SLC, Complejo Quisque (hilltop construction)



Period II, non-SLC, Virahuanca Alto (PV31-326)

Figure D- 10 Photographs of ceremonial centers of Virahuanca Bajo North, Complejo Quisque and Virahuanca Alto.



Period III, SLC 302, Huancarpón (PV31-59)



Period III, SLC 305, Chacuas Cucho I (PV31-184/185)



Detail of Chacuas Cucho I: Central plaza with standing stone or "huanca"

Figure D- 11 Photographs of ceremonial centers of Huancarpón, Chacuas Cucho 1 and detail of standing stone (huanca) from Chacuas Cucho 1.

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